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A Week of Larger Buying

Railroad Policy Now in Doubt

Activity in Western Pig Iron Markets with More Aggressive Competition

The question uppermost in the iron trade is the extent to which the Government injunction of rate advances by Western roads will affect railroad buying. This action, coming on the eve of the enforcement of the new rates, and after the railroad companies had planned for larger expenditures in the expectation of increased revenues, has sharply checked the better sentiment that has recently prevailed.

The Chicago district has been the chief center of activity in the past week. Pig iron contracts closed there, chiefly for basic and malleable Bessemer, amounted to fully 60,000 tons, while orders for bridge work were placed by the railroads after long negotiations, to a total of more than 24,000 tons.

Buying of pig iron has brought out lower prices in nearly all markets, Chicago showing aggressive competition from producers in other districts. Buffalo reports sales of 40,000 tons at from 25 to 50 cents below last week's basis. Southern iron has been sold in round lots at $11.50, Birmingham, for No. 2. In some cases producers not willing heretofore to name this price have come to it, and after booking a certain amount have refused further orders for last half below $12.

In New England, iron from New York State and Virginia furnaces has sold as low as $17.50, delivered. There are furnaces in both districts, however, that will not meet such prices.

In steel making iron sharp competition developed in the Chicago district for one 10,000-ton contract for an independent steel plant, a large Southern producer securing the business. In the Pittsburgh district basic and Bessemer irons have again lapsed into dulness. The hope that the leading interest would buy has received no encouragement, particularly as it has cut down its own production to a greater extent proportionately than have the merchant furnace companies. One Steel Corporation furnace started up this week, leaving 30 now idle.

Bessemer billets are weaker and resale steel has been offered at close to $25, Pittsburgh.

Rail orders include 12,600 tons for the Seaboard Air Line, taken by the Tennessee Company. A sale of 4500 tons has been made to the Isthmian Canal Commission and these rails will also be rolled at Ensley. The international rail market has stiffened up, as the rail mills in all countries have been comfortably filled. British and Continental mills have advanced the price 5 shillings, following the advance of some weeks ago in plates and structural material by Scotch and North of England mills. Inquiries have been received in this country from Australia for 27,000 tons of rails and there is some inquiry also from Brazil.

S. DIESCHER & SONS.
Mechanical and Civil Engineers,
PITTSBURGH, PA.

The structural business of the week has been excellent, particularly in the West. Railroad contracts taken by the American Bridge Company include 10,000 tons for the Northern Pacific, 4000 tons for the Great Northern, 4400 tons for the Soo Line, 1500 tons for the Chicago Great Western and 3500 tons for the Pennsylvania Lines West, the last named placing 700 tons additional elsewhere. The Fort Pitt Bridge Company will furnish 3000 tons for wharf sheds at New Orleans and the Worden-Allen Company 3300 tons for the Milwaukee Electric Railway Company. Low fabricating prices are heard from in the East and the Central West, and in plain structural material, as in plates, sales at 1.45c., Pittsburgh, are more common.

At Pittsburgh the prospect of larger railroad buying has been made much of by steel manufacturers in the past week, the New York Central being credited with negotiations for 450 locomotives and the Baltimore & Ohio for 250. All such calculations are now subject to revision.

The Texas Company has been figuring on 200 to 250 miles of 8-in. pipe for an oil line. In California a proposed water line from the mountains to Los Angeles will require 40,000 to 50,000 tons of plates.

The wire trade, in which for some time buying by jobbers has not been up to expectations, shows improvement, with a better movement of stocks from jobbers' hands. There is more inquiry also from manufacturers of bolts and screws.

European Purchases of American Bonds

European financial resources continue to be drawn upon to meet the necessities of our railroads. The official announcement last Thursday that a group of French banks had purchased the entire $50,000,000 of bonds to be issued by the Chicago, Milwaukee & St. Paul Railroad Company was received with much satisfaction by American financial and general business interests. This is the most important single transaction of the kind that has so far come to light. Including this purchase, it is estimated that in the five months of the year just ended a total of over $120,000,000 of American securities has been marketed exclusively in Europe, while French, German and British bankers have participated in absorbing American railroad bond offerings of at least an equal amount. Negotiations are stated to be in progress for placing abroad considerable additional quantities of American railroad bonds, and it would not be surprising if the amount should reach $100,000,000, According to the *Wall Street Journal*, a leading American banker makes the statement that the success achieved in enlisting the backing of the ultra-conservative Credit Lyonnais, the leading bank of Paris, for the distribution of the St. Paul bond issue will tend greatly to raise the standing of American securities abroad. It is interesting to note that the number of individual bonds into which the St. Paul issue will be divided will be over 400,000, or of a value of about $100 each, indicating how widely they will be distributed among investors of France and other countries of Europe.

It is, of course, not altogether pleasant to contemplate this increase in our foreign indebtedness. The money now borrowed must ultimately be repaid, while the interest will help to swell the annual foreign account which must be met by shipments of merchandise or gold. This year, however, we are in such a position that the purchase of so large an amount of our bonds by European investors will greatly relieve a situation which was fast becoming strained, to say the least. Our once enormous international balance of trade has not only dwindled to nothing, but some months witness a greater value of imports than of exports of merchandise, thus requiring exports of gold to meet adverse balances. While our liquid capital has thus been heavily drawn upon, our railroads have, as usual, developed necessities requiring the use of large amounts of money for the purpose of enlarging their facilities for handling the steadily expanding business of the country. It is highly creditable to the standing of our great banking houses that in this emergency they have had sufficient influence abroad to enlist the co-operation of European bankers. The tension of the financial situation is thus happily being corrected.

The foreign investment in American securities will not only check the shipments of gold, which if continued much further would cause financial stringency, but will enable the railroads to purchase needed equipment and to enlarge other facilities for handling traffic which will give business to numberless American industries. Part of the capital secured by foreign purchases of securities may be used, it is true, to refund obligations now falling due, but nevertheless a considerable amount will be available for desired improvements. Immediate benefit to general business is therefore to be expected. The future may be relied upon, as heretofore, to take care of itself, as railroad and business expansion in this country is always prolific of excellent results.

In this connection it may be remarked that the splitting up of bonds into small denominations for the purpose of attracting the favor of foreign investors seems to be worthy of trial in this country. The so-called "small lot" investor in stocks has been found sufficiently numerous to wield considerable influence in times of depression when securities are to be had at bargain prices. The number of individuals able to make moderate savings from their wages or salaries is very large, and if they were able to buy bonds in denominations of $100 to $250 it is likely that the aggregate which would then find lodgment in the hands of the masses would be huge. It would appear to be an experiment worth trying by some of our railroad companies now endeavoring to place an issue of bonds to adopt the plan of a "popular loan" by offering at least a portion of their bonds in small denominations. The wider distribution of railroad bonds, if it could be thus effected, would not only tend to greater stability in their prices, but might also prove beneficial to railroad interests by enlarging the number of citizens who would have a friendly feeling toward railroads through such investments. There is certainly great need at this time of popularizing railroad affairs.

Profit-Bearing Orders

In the annual report of a large traction company occurs a statement to the effect that, inasmuch as the total profits earned for the year were so much and the total passengers carried were so many, the profit earned per passenger was a certain stated amount. On the surface this looks all right, yet the fallacy of the statement can be easily shown and will readily be admitted by most persons. No one will deny that the road must

carry a certain hundred thousand passengers before it will have recovered the expenses of operation, and hence before it can earn one cent in profits. It is, then, not the first but the last million passengers carried which furnishes the profits of the corporation.

In this is crystallized an important but seldom considered truth. That it is realized by some is evidenced by the much advertised railroad excursions and by the dumping of manufactured products in Europe by our factories in times of depression at home. In the first case, the railroads are after the "last million" with its dividend paying fares; in the latter, the manufacturing company is seeking the "first million" to pay its running expenses, which still pile up, although half its capacity may be shut down.

The application of this principle to manufacturing establishments generally has not, however, been very widespread, although it presents itself as equally applicable to other classes of business than the railroad and the factory. All that is required to indicate the extent to which the practice may be carried is a chart showing how the expenses vary with the volume of business transacted, and good, sound business judgment. This last is mentioned in distinct contrast to the slave of custom, who estimates and quotes by rote, encouraging himself over the loss of a big order, with the defense that "if we can't get the order at our regular prices, we don't want it at all." But the fact still remains undisputed that maximum output tends to maximum returns; and it presents itself as a truly sane action for a firm to take additional business at reduced rates, provided that can be done without disturbing its own natural market, when an examination of its plant and books has shown enough business already accepted at regular rates to meet the normal running expenses.

The Work of the American Iron and Steel Institute

The account of the first annual meeting of the American Iron and Steel Institute given elsewhere indicates that after a period of comparative inactivity this organization has plans on foot which, if carried out, will make it widely influential. An ambitious programme of work in technical, commercial, sociological and statistical lines has been proposed. The extent to which practical effect will be given to it will depend much upon the subsequent action of the directors and upon the manager into whose hands the direction of the work is committed. It may seem that the technical field is already occupied by the American Institute of Mining Engineers and by the Iron and Steel Institute, which for 40 years has had its headquarters in London, while all its officers have been connected with the British iron trade with the exception of Andrew Carnegie, president in 1904, the year of the American meeting, and the vice-presidents chosen last year from the United States, Germany and France. But the former of these two organizations has iron and steel metallurgy and iron and steel works practice as but one of its various fields. The Iron and Steel Institute, to be sure, has as its exclusive purpose the "discussion of practical and scientific subjects bearing upon the manufacture and working of iron and steel"; but its membership, while international, includes comparatively few of the younger men who have come up in the American iron trade in the past ten years.

It may be that the lines of operation suggested for the American Iron and Steel Institute at the meeting in New York last week are more than a single organization can hope to compass. That is the criticism which will naturally be passed on these proposals as they stand. Judging from the auspices under which it was formed and its official personnel, the institute may be expected to give chief prominence to commercial and betterment questions.

It is noteworthy that the first special committee to be appointed is to deal with a matter that concerns vitally the interests of employees. Mr. Dickson, in introducing his argument for a six-day week for all iron and steel workers, at the dinner of Friday night, referred to the efforts of the Steel Corporation looking to the cutting down of seven-day labor to a minimum and to the difficulties encountered in connection with the continuous processes. The co-operation of all steel manufacturers was invited in devising a workable plan under which no employee shall be on duty for 12 hours a day seven days in the week. The result was the unanimous passage of a resolution referring the matter to a committee of five to prepare a plan and submit it to the institute.

With full appreciation of the difficulties involved in the proposal thus put before the steel manufacturers of the country, it may safely be said that they are not insuperable. With their record for the solving of problems that have repeatedly blocked the advance of the industry, the engineers and managers who have done so much to put American steel works practice in the forefront will not be willing to confess failure in advance, when thus challenged to bring about a much desired change. Ore unloaders, traveling cranes, charging machines for open hearth furnaces, automatic skip hoists, pig iron casting machines and the whole list of mechanical improvements that have been steadily cutting down the exhausting drudgery of iron and steel works operations have been the response of engineers to the constant demand for new economies in production. It will scarcely be claimed that the substitution of a six-day week for a seven-day week and the abolition of the 84-hour week in the iron industry are of less consequence than the ends served by any of the mechanical improvements mentioned.

One consideration should not be overlooked in connection with this first concerted effort of the American Iron and Steel Institute in lines other than commercial. The iron industry is largely exempt from labor union domination. It should, therefore, be in all particulars, as it is in most, an industry in which the conditions of employment are better than the coercive measures of militant unionism have succeeded in making them.

Pig Iron Stocks as a Market Factor

When stocks of pig iron in the hands of merchant furnaces have been referred to in various comments on the pig iron market in recent months, surprise has been expressed that an accumulation so small should cause such weakness in the market. The stocks at merchant furnaces April 1, for example, which were estimated by producers at 1,000,000 tons, were spoken of as "less than a two weeks' supply." That is true, if

the comparison is made with the total production of the country. But that is not the case. The comparison of merchant furnace stocks should be made with merchant furnace production, which is somewhat less than one-third the total production. Therefore, the time such stocks would last in the trade to which they would naturally go would be three times as long as the common estimate given above. Moreover, when large steel companies that ordinarily buy a portion of their pig iron requirements in the market find their own blast furnaces more than adequate to supply their needs, steel making pig iron is to a considerable extent eliminated from the account, leaving the accumulations at furnaces to be compared, for the most part, with the ordinary consumption of foundry and mill iron. It can be seen, on such a statement of the situation, that the significance of the stocks reported April 1 is not just what might be concluded from the standards of measurement usually applied.

This is not saying that the stocks recently reported are a serious weight upon the market. It is simply calling attention to the fact that a statistical statement needs to be judged in the light of conditions not expressed by the figures, also that with a falling market and hesitating buyers a given stock is a heavier incubus than the same stock would be when buyers are keen to contract. In other words, it is fair to say that the stocks of pig iron now at blast furnace yards are exerting just about the influence they might be expected to exert, in view of all the conditions. It should be borne in mind, too, that stocks are but one of a number of considerations that determine the attitude of pig iron buyers.

Workmen's Compensation Needs Amendment

The experience of Great Britain with its Workmen's Compensation act suggests that one point in particular should have careful attention from the various State commissions now at work in this country. Provision should be made in any bills that may be framed, so that the line shall be sharply drawn between an actual accident and injury resulting to a workman through his own physical weaknesses. The British courts have taken a very liberal view of this question considered from the standpoint of the employee. Case after case has been decided against the employer where inherent physical weakness in a workman was developed in the course of his labor and resulted in the loss of his time or in his death. In a case just decided a man suffered from heart disease, which might have carried him off at any moment. He was tightening a nut with a spanner wrench, when the effort ruptured the aneurism and he died. The final court of appeal decided that while the strain of the work was quite ordinary the case came within the provisions of the act, because the man died, not from the disease alone, but from the disease and the employment taken together.

It is easy to see where hundreds of cases of physical incapacity and scores of deaths would result annually in this country from cases akin to that which figured in the above decision. Any law that compels an employer to compensate his workmen for their own physical infirmities is unjust. It would seem to suggest a physical examination for every man as a preliminary to his employment, with periodic examinations afterward, and his discharge if he were found to be unfit. Otherwise large damages would be constantly assessed against the employer. Doubtless the British law could be so amended as to preclude the possibility of such an interpretation. Certainly if compulsory workmen's compensation is to be adopted in this country—and it has many warm advocates—the statute should be so framed as to apply only to accidents, as commonly understood.

Texas Ore for Eastern Works

AUSTIN, TEXAS, May 26, 1910.—Regular shipments of iron ore from the Cass County field of Texas to Eastern iron or steel works will be inaugurated in June, according to advices received by the State Railroad Commission. It is announced that these shipments will have no connection with the exploitation of iron ore beds in that section of the State which Charles M. Schwab and associates are preparing to carry on. The information received came in the form of a joint application from the International & Great Northern Railroad, the Texas & Pacific Railroad and the Texas City Terminal Company for authority to put in a rate of $1.50 a ton on iron ore, carload shipments, from Jefferson, Texas, to the ports of Galveston and Texas City. It was stated in this application that the movement of the ore would begin early in June and would be shipped to Eastern points by boat via Texas City and Galveston. It is not publicly known at this time what persons or interests are back of the proposed development enterprise.

Several months ago the railroad commission approved a similar application on the part of the Santa Fé Railroad for the movement of iron ore from the Cass County field to Port Bolivar, situated across the bay from Galveston. This application was made in the interest of the Bethlehem Steel Company, it is stated. To facilitate the transportation of the ore to Port Bolivar the Santa Fé will build a 40-mile extension of its road from Longview into the heart of the ore field. Pending the construction of this extension, the Bethlehem interests have been conducting exploration work upon their lands, with the result that the ore tonnage in sight has been increased enormously.

The Valley Mould & Iron Company's Operations.—Beginning July 1 the Valley Mould & Iron Company, Sharpsville, Pa. (formerly the Thomas D. West Foundry Company), which is a large consumer of Bessemer pig iron in making ingot molds, will begin drawing its supply of molten iron from two nearby stacks, one furnace of the Shenango Furnace Company and Claire stack of M. A. Hanna & Co. The Valley Company last fall purchased Alice stack, at Sharpsville, from the Youngstown Sheet & Tube Company, possession to be given July 1 of this year. It was presumed that the company would put this stack, which has a capacity of 275 tons per day, on Bessemer iron and use the output for its own foundry, but it seems that such is not the intention, as the Alice furnace, which is now undergoing repairs, is to be put on basic iron July 1, the product to be sold in the open market. Commencing about January 1, 1911, the Alice furnace will be put on Bessemer iron and the product will thereafter be used by the Valley Company in the manufacture of ingot molds.

The Titan Steel Casting Company, Newark, N. J., is installing additional cranes in its steel foundry. In one of the bays a 25-ton electric traveling crane will be put in to replace hydraulic cranes now in use. Six post cranes will also be added, each having a swing of 270 degrees, the cranes being alternated so that one will have 90 degrees swing in a given bay and the next a 180 degrees swing in the same bay.

The American Iron and Steel Institute

The Abolition of Seven-Day Labor at Iron and Steel Works Discussed at the Annual Dinner and a Committee Appointed to Consider the Subject—Officers for the Coming Year

The annual business meeting of the American Iron and Steel Institute was held at the Waldorf-Astoria, New York, Friday, May 27, at 4 p.m., and in the evening at 7.30 at the same place was held the annual dinner. While the members had not been called together for months, or since the dinner in October, 1909, when his fellow manufacturers paid their tribute to Judge E. H. Gary, the president of the institute, there has been a gain in membership, the number being now 240; and the directors have had under consideration plans for making the organization effectively active. These were discussed at the meeting of Friday afternoon, with the result that the institute gives greater promise of permanent usefulness than at any time in its career. It would seem, indeed, that the purpose of the officers is to give the institute a wider scope than that of any organization connected with the steel industry either at home or abroad.

Lines of Work Outlined

President Gary spoke at some length of the various activities in which the Board of Directors felt that the institute might well engage. While, unlike the Iron and Steel Institute, which has headquarters in London, it might continue to give attention to commercial questions, it should also take up the technical side of the industry and make technical papers an important feature of its stated meetings. The relations of the industry in the United States to producers in other countries, and matters pertaining to international trade in iron and steel were also referred to as properly within the scope of the institute. Then there were the relations of employers and employees and the important questions of accident compensation, relief and pension systems, and hours and other conditions of labor.

In the discussion that followed, the advisability of entering upon all the lines of activity suggested was urged by a number of speakers. Statistical matters, it was also brought out, offered a broad field of activity, and in commercial lines it was the opinion of a number of members that much could be done, particularly in the line of giving greater validity to contracts for iron and steel products.

It was decided, on the recommendation of the directors, to hold a meeting of the institute in New York in the fall of 1910, and to invite the attendance of representatives of the iron and steel industries of Great Britain, Germany, France and other European countries. At this meeting, with sessions extending over two or three days, papers will be read and questions of international interest discussed.

It was also the unanimous sentiment of those present that the conduct of the affairs of the institute should be put in the hands of a secretary, giving all his time to its interests, and that permanent headquarters should be established.

Officers for the Coming Year

The election of officers for the coming year resulted in the choice of the following, all of whom are re-elected:

President—Elbert H. Gary, United States Steel Corporation.

First Vice-President—Powell Stackhouse, Cambria Steel Company.

Second Vice-President—Willis L. King, Jones & Laughlin Steel Company.

Third Vice-President—Charles M. Schwab, Bethlehem Steel Company.

Treasurer—Edward Bailey, Central Iron & Steel Company.

Secretary—Wm. J. Filbert, United States Steel Corporation.

Directors for term expiring 1912: T. J. Drummond, Lake Superior Corporation; W. J. Filbert; J. C. Maben, Sloss-Sheffield Steel & Iron Company; W. A. Rogers, Rogers, Brown & Co.; J. F. Welborn, Colorado Fuel & Iron Company.

Directors for term expiring 1913: Edward Bailey; E. A. S. Clarke, Lackawanna Steel Company; Willis L. King; Samuel Mather, Pickands, Mather & Co.; John A. Topping, Republic Iron & Steel Company.

A meeting of the directors was held, following the business meeting of the institute, and ways and means of carrying out the action taken by the members were discussed, particularly the selection of a secretary, who shall establish headquarters and actively forward the objects of the institute; also plans for the fall meeting in which foreign iron and steel manufacturers will participate.

THE ANNUAL DINNER

Between 80 and 90 members of the institute attended the dinner at the Waldorf-Astoria Friday evening, which was presided over by Judge Gary. When the after-dinner programme was reached Judge Gary spoke of the afternoon meeting and the questions considered there and in the later meeting of the directors, relative to the lines of work to be taken up by the organization. He particularly urged that every member work to increase the membership of the institute, bringing into it representatives of all departments of the industry. To the speaker's mind among the important matters to be dealt with by the institute are what might be called sociological questions, those relating to the welfare of employees and to hours and other conditions of labor. He had asked Mr. Dickson, first vice-president of the United States Steel Corporation, to speak on one phase of the labor question, namely the desirability of eliminating Sunday labor in the steel industry as far as possible, guaranteeing to all workers a six-day week.

Mr. Dickson's Address Advocating a Six-Day Week

Mr. Dickson spoke as follows:

The Iron and Steel Institute, usually known as the British Iron and Steel Institute, by common consent has hitherto been regarded as the leading exponent of all matters, other than commercial, of interest to the iron and steel industry. This position of leadership was natural and well deserved, owing to the fact that Great Britain was for so long the largest producer of iron and steel products. Conditions, however, have changed in recent years, Great Britain being outstripped in the race, first by the United States and later by Germany.

We now have a large lead, and it is safe to assume that our natural resources, our growing population and our vast territory will enable us to maintain our position as leader for many years. By analogy, the recently formed American Iron and Steel Institute, which we to-night represent, should in the course of time assume an important, if not pre-eminent, place in the development of this industry. This it can and should do; not in any ungenerous spirit of rivalry with our brethren across the sea, but because the changed conditions have placed within its sphere of influence large questions affecting our industry which must be solved, if solved at all, by the united wisdom of American iron and steel manufacturers. It is manifest, therefore, that on you gentlemen, who are the incorporators and directors of the institute, devolves an important and far reaching duty in determining

the scope of the work of the institute and the policies to be pursued.

A BROAD SCOPE FOR THE AMERICAN IRON AND STEEL INSTITUTE.

I am informed that the subjects which are permitted to come before the British Iron and Steel Institute have been limited in the main to technical and scientific questions, special care being taken to avoid discussion of commercial questions. Whether or not this same policy will be pursued by this institute will be decided, of course, by the directors. In addressing you to-night, however, I am assuming that a broader policy will be outlined, which will include not only commercial but sociological questions as well.

It is not my purpose to discuss or even to suggest all the matters deserving of your attention. In fact, I desire to present only one question; but that, in my judgment, is of such paramount importance to the future welfare of the trade that it is deserving of your immediate and earnest thought. This question is a phase of the relations between the manufacturer and the employee. I am quite aware of the difficulties surrounding a discussion of this subject; nevertheless, I believe it presents questions which must be faced, and that soon, and it is the American way to meet difficulties openly.

RECENT BETTERMENT MEASURES OF THE STEEL CORPORATION.

As you are aware, the United States Steel Corporation has recently taken some advanced steps in matters vitally affecting the relations between our various companies and their employees, namely, the reduction of seven day labor to a minimum, the establishment of a system of accident and accidental death relief, and the establishment of a pension system.

In considering the first named, *i. e.*, the question of a seven-day week, we were, of course, met at the outset by the difficulty of adjusting a six-day week to the operations which are necessarily continuous and which are generally so recognized, even by the most radical opponents of the seven-day week. This refers particularly to such departments as the blast furnaces. The corporation has not yet been able to devise a practical working system by which the men employed at these continuous operations can be given one day off in seven, and the purpose of this paper is to invite the co-operation of other companies operating blast furnaces, with a view to devising some workable plan.

In this connection I may state that as recently reported in the press, Mr. Schwab has very properly protested against the Government officials singling out his company for criticism on this point, as the practices at Bethlehem which were criticised are common to all blast furnace plants.

THE TREND OF SENTIMENT.

The tendency of the times is plainly in the direction of some measure of regulation by the public authorities, both State and federal, of the conditions under which workingmen are employed. The most striking evidences of this trend are the two employers' liability bills recently introduced in the New York Legislature, one of which has been passed and has been signed by the Governor; the signing by Governor Harmon of Ohio, on May 12, of a drastic and far-reaching employers' liability law; the recent appointment by Governor Fort of New Jersey, of a commission to recommend similar legislation to the next Legislature of New Jersey; and the amendment of the bill for the building of two battleships and other vessels, providing that all material used shall be the product of eight-hour labor. This amendment was introduced by Mr. Fitzgerald of New York, and has passed the House and the Senate.

Shall we endeavor to pass through these troubled waters "under power," with sufficient headway to insure steerage way, or shall we be satisfied to drift, taking our chances of disaster on the sunken rocks of radical and ill-advised legislation? True conservatism consists not in standing still and attempting to ignore public sentiment, but rather in adjusting our methods of operating to meet the changing conditions of our times. We will thus take the place in the body politic to which our intelligence and experience entitle us, and give powerful aid in the difficult task of solving these pressing problems on a reasonable basis, which will be fair to all of the interests involved.

EIGHTY-FOUR HOURS LABOR A WEEK A REPROACH.

It is my own deliberate judgment, after a period of almost 30 years continuous connection with the industry, the early part of which was passed in manual labor in the mills, that the present conditions which necessitate the employment of the same individual workman 12 hours a day for seven days a week are a reproach to our great industry, and should not in this enlightened age be longer tolerated.

I therefore urge upon the directors of the institute the appointment of a committee to consider this question and devise a workable plan which can be recommended to all companies, whereby no individual shall be on duty for more than six consecutive days. I urge this because it is the right thing to do and is in line with the spirit of the age in which we live, and I am confident that these are sufficient reasons to insure its being done. If, however, any further reason should be necessary, in my judgment we have the conclusive one that if we do not do it voluntarily we will in the near future probably be compelled to do it by the passage of legislation by the various State Legislatures which may be so radical as to create a serious situation for the entire iron and steel industry.

Discussion on Labor Questions and Other Phases of the Institute's Work

Calls were made upon various members for comments upon Mr. Dickson's address or on other matters pertaining to the work of the institute. C. M. Schwab, while approving of proposals for bettering labor conditions referred to the serious questions involved in the shortening of hours. The cases in which men work seven days a week, 12 hours a day, he said, are not numerous. As for an eight-hour day, that meant a heavy increase in labor cost and a practically impossible increase in the number of steel works employees. It was a question whether consumers would pay the prices for steel products which such a change would compel, labor cost being so large a proportion of the total cost of steel production. He commented on the unfairness of a recent Government report on labor conditions at South Bethlehem since in the entire steel industry similar hours of work prevailed and cited as an indication of the present condition at Washington the remark made to him by a member of Congress that whatever proposal came to Congress with labor backing would receive a practically unanimous vote.

Other speakers were Willis L. King, Joseph G. Butler, Jr., Geo. W. Perkins, E. A. S. Clarke, J. A. Campbell and O. P. Letchworth. Messrs. Clarke, King and Letchworth referred to the possibilities of the institute in securing co-operative effort. Mr. Perkins believed much could be done toward the solution of the question raised by Mr. Dickson; that the leaders in the steel industry were able to make adjustments which would leargely do away with seven-day labor. He was disposed to question whether in the absorption of manufacturers in the great problems before them in the past 10 years they had treated their employees as fairly as they ought.

Mr. Butler, after saying that any radical change in hours of labor in the iron and steel industries would be a matter of no little time, referred to the present condition of the pig iron market. Bad as it had been considered, stocks of pig iron at furnaces on April 1 were only about 1,000,000 tons, or less than a two weeks' supply, while standard Bessemer made up only 100,000 tons of the total. He turned aside to speak of the proposed McKinley Memorial Building, at Niles, Ohio, the birthplace of the late President, and asked for the help of all iron and steel manufacturers in carrying out the plan.

Mr. Campbell said that his company, the Youngstown Sheet & Tube Company, had put in operation a profit sharing plan last July, and later had devised a system of compensation for employees injured in accidents. He considered it unfair that employees at iron and steel works should be asked to work 12 hours a day seven days in the week.

On Mr. Campbell's motion the directors of the institute were asked to appoint a committee of five to investigate the question of seven-day labor in continuous processes in the iron industry as raised in Mr. Dickson's paper and submit a report to the institute.

International Competition Without Antagonism

Judge Gary, in introducing Fritz Thyssen of the Deutscher Kaiser Works of Thyssen & Co., referred to the father of their guest as the "Carnegie of Germany," and to the friendliness with which the Thyssen firm had received the proposal that there should not be unnecessary antagonism in international competition in the steel trade. Mr. Thyssen acknowledged the cordiality which he had met in his travels among the iron

mines and iron and steel works of the United States; he spoke also of the interest with which Judge Gary's views on co-operation had been received by iron and steel manufacturers abroad.

In bringing the programme to a close Judge Gary said that for himself he did not favor taking up sociological questions, such as the one they had considered, because of any feeling that a public sentiment compelled them to do so. Fidelity to the interests of those whom they represented was to him an important consideration. The highest type of an honest man is not the one who leans backward in his effort to be fair, but the one who is not afraid to decide in favor of his own friend if that decision would be right. The American Iron and Steel Institute should never be in the position of being pushed to take a certain stand because of a public sentiment that might overwhelm it, without regard to whether that sentiment was right. It ought to be so fair and so just that it shall come to be a leader and that it shall be followed by public opinion, because it has a right to be so followed.

In Attendance at the Dinner

Those present at the dinner were the following:

Edward Bailey.	G. G. McMurtry.
George Bartol.	C. A. Meissner.
E. J. Buffington.	Charles MacVeagh.
Michael Blake.	Charles F. Miller.
J. G. Butler, Jr.	V. Mumford Moore.
J. A. Campbell.	Benj. Nicoll.
Jas. J. Campbell.	Wm. P. Palmer.
E. A. S. Clarke.	E. W. Pargny.
L. E. Cochran.	Leonard Peckitt.
E. S. Cook.	J. A. Penton.
Theron I. Crane.	Geo. W. Perkins.
Geo. G. Crawford.	Antonio C. Passano.
H. G. Dalton.	John O. Pew.
Thomas Devlin.	Wm. S. Pilling.
W. B. Dickson.	Chas. S. Price.
A. C. Dinkey.	Chas. F. Rand.
Philip S. Dyer.	David Reeves.
R. H. Edmonds.	John Reis.
B. F. Fackenthal, Jr.	J. V. W. Reynders.
J. A. Farrell.	F. B. Richards.
Wm. E. Farrell.	W. D. Sargent.
E. C. Felton.	Wm. B. Schiller.
W. J. Filbert.	Chas. M. Schwab.
Alvin I. Findley.	Samuel B. Sheldon.
Lewis W. Francis.	A. J. Singer.
Elbert H. Gary.	Louis A. Shepard.
James Gayley.	Powell Stackhouse.
Tracy W. Guthrie.	W. A. Thomas.
Edw. M. Hagar.	Fritz Thyssen.
Harry E. Higgins.	Alex. W. Thompson.
George E. Holton.	John A. Topping.
A. F. Huston.	Richard Trimble.
O. N. Hutchinson.	E. C. Wallace.
James Inglis.	W. R. Walker.
Archibald Johnston.	F. S. Witherbee.
Jonathan R. Jones.	F. W. Wood.
David G. Kerr.	Walter Wood.
Willis L. King.	W. P. Worth.
Frank G. Kennedy, Jr.	Edw. H. Worth.
O. P. Letchworth.	Chas. H. Zehnder.
Thos. Lynch.	E. M. Zehnder.

The Rolfe Iron Company, Chicago, has purchased the plant and equipment of the Riverdale yard of B. Nicoll & Co., and will engage on an extensive scale in the wholesale scrap business. This yard is one of the largest and best equipped in the Chicago district, having cranes, shears and equipment for handling the heaviest grades of material. The yard has been conducted by B. Nicoll & Co. of New York for the past three years, but they have recently closed out their large stock of scrap, and H. W. Rolfe, who was formerly their Chicago manager, has engaged in a manufacturing business. G. J. Carroll is president of the Rolfe Iron Company; R. T. Rolfe, vice-president, and H. W. Bryant, secretary and treasurer.

The Pittsburgh, Cincinnati, Chicago & St. Louis Railroad Company (Pan Handle) is planning another bridge across the Wabash River at Logansport, Ind. It will be the longest railroad bridge in the State. Traffic on the present one-track structure is such that an engine passes over it every three minutes day and night. The proposed new structure will be double tracked.

Canada's Free Imports of Metallic Products

TORONTO, May 28, 1910.—The imports from the United States and the United Kingdom of iron and steel articles into Canada, as given in *The Iron Age* of May 12 for the 11 months ending with February, were only such as were subject to duty. In addition the following metallic products were admitted free of duty during that period:

	United States.	United Kingdom.
Ores of metals	$2,629,306	$29,334
Coke	1,463,870	5,665
Diamond drills	53,474	585
Aluminum blocks, bars, &c	308,462	59,361
Anchors	3,015	5,496
Brass cups for the manufacture of cartridges	13,073	27,389
Scrap brass	141,690	3,020
Brass in blocks, ingots, &c	13,372	376
Brass, unpolished tubing	140,705	72,209
Brass in bars or rods	308,449	23,305
Britannia metal in pigs, &c	17,510	278
Canada plates, terne plates, &c	.....	563,091
Chain	149,591	5,418
Scrap copper	11,599	507
Copper in pigs, &c	534,657	.....
Copper in bars, &c	1,647,855	1,039
Copper in strips, sheets, &c	416,722	14,313
Copper tubing	33,372	49,581
Copper rollers for calico printing	13,991	19,785
Cream separators	401,312	74,188
Cream separator materials	158,036	10,769
Rods not less than 5-16 inch in diameter for making chains	20,198	1,867
Wire Rods	557,576	82,914
Boiler plate	335,025	24,516
Rolled iron or steel for manufacture of milling cutters	.....	365,821
Steel sheets and strips, 14 gauge and less	.....	610,508
Steel hoop, band, &c., 14 gauge and less	.....	23,772
Galvanized iron sheets	.....	1,059,689
Lacquered or brass covered bedstead tubing	119,747	35,144
Carriage rail tubing so covered	4,789	6,445
Tubing for window extension rods	3,786	1,238
Ship beams, sheets, plates, angles, &c	89,736	41,196
Rough tires for locomotive and car wheels	54,831	6,818
Manufactured metal articles for ships	29,829	29,125
Tea lead	7,417	93,014
Mining machinery	378,804	112,035
Machinery for alluvial gold mining	59,822	.....
Rock drilling machinery	106,188	771
Printing presses	358,478	992
Rifle making machinery	8,035	16
Rough rifle material	28,090	15,778
Beet sugar factory machinery	25,251	211
Cordage and twine machinery	10,797	3,888
Rough plow plates	235,424	313
Materials for international bridges and tunnels	312,327	.....
Nickel, German silver, in bars, &c	71,460	885
Nickel, German silver, in ingots, &c	729	12,075
Platinum retorts, &c	9,432	.....
Platinum wire, &c	57,137	5,308
Ribs, &c., for umbrellas	105,983	49,960
Sewing machine attachments	31,589	135
Bearing balls	2,812	.....
Saw and straw cutter steel	111,082	31,076
Mattress steel wire	17,333	3,409
Mower and reaper knife steel	48,543	1,140
Corset wire	30,218	10,735
Steel for buckle clasps, &c	6,131	.....
Steel for tubular bow sockets	2,863	227
Swedish rods for horse shoe nails	6,165	1,162
Tin in blocks, pigs and bars	332,254	457,089
Tin plates	638,987	1,492,936
Tin foil	77,776	1,706
Steel seamless tubing not less than 3½ cents per pound	.....	10,327
Steel or iron tubes not more than 1½ in.	8,966	1,352
Seamless boiler tubes	299,997	72,107
Barbed fencing wire	681,057	9,504
Crucible wire	.....	1,450
Wire for manufacture of boats	39,230	.....
Galvanized wire, 9, 12 and 13 gauge	1,162,407	142,107
Wire rope for ships	1,971	24,714
Wire for rope making	25,308	90,137
Yellow metal for ship repairs	6,848	14,101
Zinc in pigs, &c	26,200	54,292
Zinc spelter	102,131	172,412
Surgical instruments	147,646	29,477

C. A. C. J.

The Civic Federation and Industrial Accidents

An important meeting of the National Civic Federation was held May 25 in the Metropolitan Building, New York City, to consider the subject of compensation for industrial accidents and their prevention. August Belmont presided, and the large gathering included prominent manufacturers and representatives of other important business interests. Reports were presented from three subcommittees of the General Committee having in charge the subject above mentioned.

P. Tecumseh Sherman, former State Commissioner of Labor, made a report for the Legal Committee on Compensation that the skeleton of a bill had been drawn up, which had been sent to the other members of the committee for approval. The plan embodied in this bill, he stated, is based on the English compensation law, alleging that in some respects the Continental laws may be better than the English law, but it would be much easier to change the English law so as to be applicable to this country than the Continental laws. While he hoped that the Wainwright bill might pass the New York Legislature, the draft of the subcommittee's measure he considered better. It provides that in case of fatal accidents the relatives of the deceased would be entitled to three years of the wages he had been earning, not to exceed $3000 nor to be less than $1000. In case none were actually dependent on him the damages would be less. In case of permanent disability by accident the disabled worker would get one-half the wages he had been earning, not to exceed $10 a week for ten years. In case of partial disability he would be entitled to one-half of the difference for the same time of the wages he had been earning before he was injured and what he could earn after his injury. Employers are to be given the right to a competent medical examination of the persons injured before anything else should be done. It was decided that when the committee had agreed on the tentative draft of the compensation bill it should, before any action was taken on it, be submitted to members of the uniform State law commissions and to the State Bar associations, and their opinions would be asked as to its constitutionality.

Sylvester C. Dunham, president of the Travelers' Insurance Company, Hartford, Conn., made an admirable report as chairman of the Committee on Statistics and Cost. He outlined some of the difficulties encountered in the endeavor to segregate industrial accident statistics from the general accident statistics reported by insurance companies, advising that all kinds of companies operating in this field should be asked for information. It was decided to employ a statistician to collect the necessary data.

In a report by Louis B. Schram, as chairman of the Committee on Improvement of State Factory Inspection, co-operation with the State factory inspectors was recommended. The report stated that the committee favored working along three lines—namely: 1. Agitating for a new factory inspection law. 2. Provision for adequate execution of the law. 3. The examining of applicants for positions in the State factory inspection department.

Officers of the Federation made informal reports of the manner in which the work of the organization was being conducted, and gave very encouraging statements of the co-operation thus far secured in a very large number of States. The great interest shown by all present in the several subjects demonstrated the earnestness with which the objects of the Federation are being carried out. The most important movement at present is, of course, the work under way for securing a practical method of arriving at compensation for industrial accidents.

Canadian Notes

TORONTO, May 28, 1910.—An official statement of the disbursements on iron and steel bounty account during the fiscal year ended with March last has just been issued at Ottawa. The amount of these was $1,808,500. Bounty totaling $573,968 was paid on 740,244 tons of pig iron; $695,762 on 740,390 tons of steel; $538,812 on 89,802 tons of wire rods. The Dominion Iron & Steel Company drew the largest aggregate, and other companies participated in the following descending order: Hamilton Steel & Iron Company, Nova Scotia Steel & Coal Company and Algoma Steel Company. After the present calendar year there will be no bounties on pig iron, puddled bar and crude steel, except those still holding for the products of electrical smelting, and there will be no bounty on wire rods after the end of June, 1911.

An agreement has just been signed on behalf of the town of Owen Sound, on Georgian Bay, and by representatives of a British syndicate, for the construction there of a shipbuilding plant, ship repair plant and two drydocks. It is proposed to expend $1,000,000 on the works. There are to be berths for carrying on the building of three vessels at once. The ratepayers of the town are to be asked to vote on a by-law granting to the company a bonus of $50,000 and enabling the municipality to take stock in the company to the amount of $50,000.

It is estimated that the cost of the steel work on the Quebec Bridge will be not less than $10,000,000. It is not expected that any of the tenders now being received will be for a lower sum than this. The Minister of Railways says there will be tenders from at least seven firms in the United Kingdom, Germany, the United States, France and Canada. Since the removal of the surtax a German engineer has been busy studying the plans.

The Canadian Pacific Railway Company has decided to use steel in the reconstruction of the snow sheds on its mountain section. It is believed that the erection of steel structures in the place of the wooden ones that were swept away in the winter will be a sure protection against snow slides. C. A. C. J.

International Geological Congress.—The eleventh session of the International Geological Congress will be held at Stockholm, Sweden, August 18 to 25, 1910. The general secretary is Prof. J. G. Andersson, Stockholm. In connection with the congress a number of trips have been arranged to Swedish iron mines and Swedish iron and steel works. An important undertaking in connection with the congress is the compilation by the executive committee, with the assistance of geological surveys and eminent geologists from different countries, of a summary of the iron ore resources of the world. This is designed to show the amount and distribution of the world's supply of iron ore. The reports from the different countries are reproduced in the original languages. These are collected in two quarto volumes, together making 1100 pages. The report for the United States was furnished by Prof. James F. Kemp, Columbia University, New York.

The annual meeting of the Machinery Club of New York was held May 31, when the following were elected governors for four years: Henry Prentiss, John A. Hill, T. N. Motley, James Vandyck and F. K. Shults. R. C. McKinney, president of the club, in his annual address congratulated the officers and committees on the excellent showing made in the treasurer's report and a vote of thanks was tendered F. H. Stillman for the work he did toward organizing the club as its first president.

The Iron and Metal Markets

A Comparison of Prices

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June 1, 1910.	May 25, 1910.	May 4, 1910.	June 2, 1909.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	$17.00	$17.00	$17.00	$16.25
Foundry No. 2, Southern, Cincinnati	*14.75*	14.75	15.25	14.50
Foundry No. 2, local, Chicago	*16.75*	17.00	17.25	16.50
Basic, delivered, eastern Pa.	*16.25*	16.25	17.00	15.50
Basic, Valley furnace	*15.00*	15.00	15.50	14.25
Bessemer, Pittsburgh	*16.90*	16.90	17.90	15.90
Gray forge, Pittsburgh	*15.40*	15.90	15.90	14.65
Lake Superior charcoal, Chicago	*18.50*	18.50	19.00	19.50
BILLETS, &c., Per Gross Ton:				
Bessemer billets, Pittsburgh	*25.50*	25.50	26.50	23.00
Forging billets, Pittsburgh	*31.00*	31.00	32.00	25.00
Open hearth billets, Philadelphia	*29.00*	29.00	30.00	24.50
Wire rods, Pittsburgh	*31.00*	32.00	32.00	29.00
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	15.00	15.00	15.00	14.75
Steel rails, melting, Philadelphia	*14.50*	14.50	15.00	15.50
Iron rails, Chicago	*17.00*	17.50	18.00	17.00
Iron rails, Philadelphia	20.00	20.00	20.00	18.50
Car wheels, Chicago	*15.50*	15.50	16.00	15.25
Car wheels, Philadelphia	*15.00*	15.00	15.50	15.00
Heavy steel scrap, Pittsburgh	*15.00*	15.25	15.50	15.75
Heavy steel scrap, Chicago	*13.50*	13.50	13.75	14.50
Heavy steel scrap, Philadelphia	*14.50*	14.50	15.00	15.50
FINISHED IRON AND STEEL, Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	1.52½	1.52½	1.50	1.40
Common iron bars, Chicago	*1.47½*	1.47½	1.50	1.30
Common iron bars, Pittsburgh	1.55	1.55	1.55	1.30
Steel bars, tidewater, New York	1.61	1.61	1.61	1.36
Steel bars, Pittsburgh	1.45	1.45	1.45	1.20
Tank plates, tidewater, New York	*1.66*	1.66	1.71	1.41
Tank plates, Pittsburgh	*1.50*	1.50	1.55	1.25
Beams, tidewater, New York	1.66	1.66	1.66	1.41
Beams, Pittsburgh	1.50	1.50	1.50	1.25
Angles, tidewater, New York	1.66	1.66	1.66	1.41
Angles, Pittsburgh	1.50	1.50	1.50	1.25
Skelp, grooved steel, Pittsburgh	1.50	1.50	1.50	1.30
Skelp, sheared steel, Pittsburgh	1.60	1.60	1.60	1.40
SHEETS, NAILS AND WIRE, Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.40	2.40	2.40	2.20
Wire nails, Pittsburgh*	*1.80*	1.80	1.85	1.70
Cut nails, Pittsburgh	*1.75*	1.80	1.85	1.65
Barb wire, galv., Pittsburgh*	*2.10*	2.10	2.15	2.00
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	13.00	13.00	13.00	13.50
Electrolytic copper, New York	12.75	12.87½	12.40	13.25
Spelter, New York	5.30	5.30	5.15	5.20
Spelter, St. Louis	5.15	5.15	5.00	5.05
Lead, New York	*4.37½*	4.37½	4.40	4.35
Lead, St. Louis	*4.22½*	4.22½	4.25	4.25
Tin, New York	32.90	33.25	32.70	29.10
Antimony, Hallett, New York	8.12½	8.12½	8.12½	7.75
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.84	$3.84	$3.84	$3.64

* These prices are for largest lots to jobbers.

Prices of Finished Iron and Steel f.o.b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 30c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural shapes and sheets, No. 11 and heavier; 85c. on sheets, Nos. 12 to 16; 95c. on sheets, No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.50c. to 1.55c., net; I-beams over 15 in., 1.65c., net; H-beams over 8 in., 1.75c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.60c., net; angles over 6 in., 1.65c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.75c., base, half extras, steel bar card; tees, 3 in. and up, 1.65c., net; zees, 3 in. and up, 1.60c., net; angles, channels and tees, under 3 in., 1.50c., base, plus 10c., half extras, steel bar card; deck beams and bulb angles, 1.80c., net; hand rail tees, 2.80c., net; checkered and corrugated plates, 2.80c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.50c. to 1.55c., base. Following are stipulations prescribed by manufacturers, with extras to be added to base price (per pound) of plates:

Rectangular plates, tank steel or conforming to manufacturers' standard specifications for structural steel dated February 6, 1903, or equivalent, ¼-in. thick and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. take the price of 3-16-in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Gauges under ¼-in. to and including 3-16-in. on thinnest edge	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
Gauges under No. 9 to and including No. 10	.30
Gauges under No. 10 to and including No. 12	.40
Sketches (including all straight taper plates), 3 ft. and over in length	.10
Complete circles, 3 ft. diameter and over	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive	.05
Widths over 110 in. up to 115 in., inclusive	.10
Widths over 115 in. up to 120 in., inclusive	.15
Widths over 120 in. up to 125 in., inclusive	.25
Widths over 125 in. up to 130 in., inclusive	.50
Widths over 130 in.	1.00
Cutting to lengths or diameters under 3 ft. to 2 ft., inclusive	.25
Cutting to lengths or diameters under 2 ft. to 1 ft., inclusive	.50
Cutting to lengths or diameters under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

TERMS.—Net cash 30 days.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Black annealed sheets, Nos. 3 to 8, 1.70c.; Nos. 9 and 10, 1.75c.; Nos. 11 and 12, 1.80c.; Nos. 13 and 14, 1.85c.; Nos. 15 and 16, 1.95c. Box annealed sheets, Nos. 17 and 21, 2.20c.; Nos. 22 to 24, 2.25c.; Nos. 25 and 26, 2.30c.; No. 27, 2.35c.; No. 28, 2.40c.; No. 29, 2.45c.; No. 30, 2.55c. Galvanized sheets, Nos. 13 and 14, 2.50c.; Nos. 15 and 16, 2.60c.; Nos. 17 to 21, 2.75c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3.10.; No. 27, 3.30c.; No. 28, 3.50c.; No. 29, 3.60c.; No 30, 3.85c. Painted roofing sheets, No. 28, $1.70 per square. Galvanized roofing sheets, No. 28, $3 per square, for 2½-in. corrugations.

Wrought Pipe.—The following are the discounts on the Pittsburgh basing card on carloads of wrought pipe now in effect:

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
⅛ and ¼ in.	70	54	66	..
⅜ in.	71	57	67	53
½ in.	74	62	70	58
¾ to 6 in.	78	68	74	64
7 to 12 in.	72	57	68	53
Plugged and Reamed.				
1 to 4 in.	76	66	72	62
Extra Strong, Plain Ends.				
⅛ to ⅜ in.	63	51	59	47
½ to 4 in.	70	58	66	54
4½ to 8 in.	66	54	62	50
9, 10, 11 and 12 in.	54	42	..	..
Double Extra Strong, Plain Ends.				
¼ to 8 in.	59	48	55	44

The above steel pipe discounts are for "card weight," subject to the usual variation of 5 per cent.

Boiler Tubes.—Discounts on lap welded steel and charcoal iron boiler tubes to jobbers in carloads are as follows:

	Steel.	Iron.
1 to 1¼ in.	49	43
1¾ to 2¼ in.	61	43
2½ in.	63	48
2¾ to 5 in.	69	55
6 to 13 in.	61	43

2¼ in. and smaller, over 18 ft., 10 per cent. net extra.
2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads to destinations east of the Mississippi River will be sold at delivered discount for carloads lowered by two points, for lengths 22 ft. and under; longer lengths, f.o.b. Pittsburgh.

Wire Rods.—Bessemer, open hearth and chain rods, $31.

Steel Rivets.—Structural rivets, ¾-in. and larger, 2.15c., base; cone head boiler rivets, ¾-in. and larger, 2.25c., base; ⅝-in. and 11-16-in. take an advance of 15c., and ½-in. and 9-16-in. take an advance of 30c.; in lengths shorter than 1-in. also take an advance of 50c. Terms are 30 days, net cash, f.o.b. mill. The above prices are absolutely minimum on contracts for large lots, makers charging the usual advances of $2 to $3 a ton to the small trade.

THE IRON AND METAL MARKETS

Pittsburgh

PARK BUILDING, June 1, 1910.—(*By Telegraph.*)

Pig Iron.—The past week in the pig iron trade has been quiet. A number of blast furnace owners in the Mahoning and Shenango valleys have agreed to advance furnace labor about 10 per cent., effective from June 1, and common labor will be but on the basis of $1.70 per day. The Westinghouse Air Brake Company, Wilmerding, Pa., is inquiring for 1000 tons of No. 2 foundry and 1000 tons of Northern forge for delivery in third quarter, but it is believed the company intends to buy a very much larger quantity and that this inquiry is put out simply as a feeler. Bids are to be in by June 6. We quote Bessemer iron at $16 to $16.25; basic, $15 to $15.25; malleable Bessemer, $15.25; No. 2 foundry, $15 to $15.25, and gray forge, $14.50, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton.

Steel.—There is a fair amount of inquiry for both Bessemer and open hearth billets, and sheet and tin bars in small lots for prompt shipment. Some consumers are not taking out steel as promptly as they have been doing, and offerings of resale steel are larger. We quote Bessemer billets at $25.50 to $26, and sheet bars, $26.50 to $27; 4 x 4 in. open hearth billets, $28 to $28.50; open hearth small billets, $29 to $29.50; open hearth sheet and tin bars, $28.50 to $29, and forging billets, $31 to $32, all f.o.b. Pittsburgh, freight to destination added.

Ferroalloys.—The local market is very weak, prices on ferrosilicon having slightly declined, while 80 per cent. foreign ferromanganese is being freely offered at $40, Baltimore, or $41.95, Pittsburgh, for delivery up to the close of this year.

(*By Mail.*)

A somewhat better feeling is in evidence in the iron trade this week, probably due largely to the fact that the railroads, which have not done much buying of equipment for three or four weeks, are in the market with some large sized inquiries. These include locomotives, steel freight cars, passenger coaches and other equipment, but as yet the desired large orders for steel rails are lacking. The fact, too, that prices on nearly everything in iron and steel, particularly in pig iron, scrap and other crude materials, are believed to be at about bottom, has got consumers interested in the market, and there are more inquiries out than for some time. It is claimed positively that none of the merchant furnaces can pay the new prices for ore and make Bessemer iron at $16 and basic at $15, and come out whole. There is still a decided weakness in prices of Bessemer steel, and very close to $25, Pittsburgh, on Bessemer 4 x 4 in. billets has recently been done. A feature of the market in finished material is the large orders for line pipe that have recently been placed and others that are pending. One of these orders alone will require more than 30,000 tons of plates, all of which will be rolled by Pittsburgh mills. Should the inquiries of the New York Central and Baltimore & Ohio railroads, which aggregate nearly 700 locomotives, go through, it will mean an enormous tonnage in plates and in higher grades of steel and boiler tubes. The coke and scrap markets do not show any betterment in prices, but inquiries are more numerous, and several large contracts for coke running over the remainder of the year, and in one case through 1911 and 1912, have recently been closed. Encouraging reports are received from the wire trade, which has been very dull for a long time.

Ferromanganese.—A sale is reported of three cars, or 90 to 100 tons, of 80 per cent. foreign, on the basis of $40, Baltimore, or $40.95, Pittsburgh.

Ferrosilicon.—No new inquiry has come up in this market for some time. We quote 50 per cent. at $59 to $59.50; 10 per cent., $23.90; 11 per cent., $24.90, and 12 per cent., $25.90, all f.o.b. Pittsburgh.

Rods.—A sale of 1500 tons of open hearth rods for forward delivery is reported on the basis of $32, Pittsburgh, for soft steel rods, with proportionate advances in the price when rolled from certain grades of steel. There is a fair amount of new inquiry and the market is strong, especially on rods rolled from open hearth stock. We quote Bessemer rods at $31 to $32 and open hearth and chain rods at $32, f.o.b. Pittsburgh.

Skelp.—There is more active inquiry in the market for grooved and sheared iron plates than for some time. Some of the pipe mills that participated in recent large contracts for line pipe have been heavy purchasers of wide plates and have other inquiries out. For ordinary widths and gauges we quote grooved steel skelp at 1.50c. to 1.55c.; sheared steel skelp, 1.60c. to 1.65c.; grooved iron skelp, 1.80c., and sheared iron skelp, 1.90c., all f.o.b. mill, Pittsburgh.

Steel Rails.—Last week was another good week in light rails, the Carnegie Steel Company having entered new orders for about 5000 tons in addition to receiving specifications against contracts. We quote steel axles at 1.75c. to 1.80c. and splice bars, 1.50c., at mill, Pittsburgh. Light rail prices are as follows: 8 to 10 lb., $32; 12 to 14 lb., $29; 16, 20 and 25 lb., $28; 30 and 35 lb., $27.75, and 40 to 45 lb., $27, Pittsburgh. These prices are for 250-ton lots and over, and for small lots premiums of 50c. per ton and more are being paid. We quote standard sections at $28, at mill.

Structural Material.—The American Bridge Company has received a contract for the building of about 20 steel barges, each of which will require about 300 tons of plates and shapes, and will have a carrying capacity of 1400 gross tons. The same interest has taken 4000 tons of bridge work for the Pennsylvania Lines West for 1910 delivery. The Riverside Bridge Company, Wheeling, W. Va., has taken 2200 tons for new buildings for a rubber company at Canton, Ohio, the material to be rolled by the Carnegie Steel Company, and the same interest has taken 500 tons for new buildings for the Ford Motor Company at Detroit. The McClintic-Marshall Construction Company has taken about 300 tons for the Seidel Building in the East End, also 1200 to 1500 tons of bridge work for the Big Four at Mount Carmel, Ind. Bids went in Tuesday for a new bridge at Louisville for the Kentucky & Indiana Railroad, which will require about 16,000 tons. The Pittsburgh Plate Glass Company will rebuild at once its plate glass works at Ford City, Pa., recently burned down, and the new buildings will require about 5000 tons of steel. All the bids on the county bridge at Oil City, Pa., 1500 tons, on which the King Bridge Company, Cleveland, was the lowest bidder, have been thrown out, and bids will be readvertised. There is a good deal more inquiry and a good deal of work is being placed, but prices are ridiculously low and in some cases are said to be below actual cost. An Eastern mill has recently taken several contracts in the Wheeling, Cleveland and Canton, Ohio, districts at prices that are said to be below the 1.50c. basis for plain material. We quote beams and channels up to 15-in. at 1.50c., Pittsburgh.

Plates.—While no important contracts for steel cars have been given out in the past week, there are some large inquiries in the market not only for cars, but also for locomotives. The Baltimore & Ohio Railroad is inquiring for about 5000 steel cars, 100 to 150 passenger cars and 240 locomotives. The St. Louis & San Francisco is inquiring for 500 general service gondola cars, the Grand Trunk for 1000 steel hoppers—but these will likely be built in Canada—and the Toledo & Ohio Central for 1000 to 2000 composite cars. The New York Central is in the market with an inquiry for 450 locomotives, contracts for which are expected to be placed in a short time. Seven or eight lake ore boats are being figured on and some of these will likely be given out in a short time. A water line is under way to take water from the mountains into Los Angeles, and if this goes through it will require 40,000 to 50,000 tons of plates. The outlook for the plate trade is thus very encouraging. Some of the smaller mills continue to name 1.45c. on plates for reasonably prompt shipment, but the larger mills, that are pretty well filled up, are holding ¼-in. and heavier at 1.50c., Pittsburgh.

Sheets.—We note a fair amount of new inquiry for black and galvanized sheets, but the market is being disturbed to some extent by concessions of $2 to $3 a ton on both black and galvanized, which are being offered by some of the outside mills. The leading sheet mills are well filled up on contracts, on which buyers are specifying quite freely, and as a rule are not meeting these concessions in prices, which are only obtainable on contracts for prompt shipment. Regular prices will be found on a previous page. The Follansbee Brothers Company, Pittsburgh, will add two more hot mills to its sheet mill plant at Follansbee, W. Va.

Tin Plate.—This is one of the most active products in the whole list, the leading mills being filled up on both bright and terne plates for three or four months, and have also taken considerable business for delivery in the fourth quarter. The market is very firm. We continue to quote 100-lb. cokes at $3.60 per base box, f.o.b. Pittsburgh.

Bars.—The leading bar mills are well filled with orders for several months and specifications against contracts are coming in freely. In fact, the two leading local makers of steel bars are 60 days or more behind in their shipments. There is a fair amount of new inquiry for iron bars, but the mills are able to make reasonably prompt deliveries. We quote steel bars at 1.45c. and iron bars at 1.55c., Pittsburgh, in large lots.

Hoops and Bands.—Some increase in new inquiries is reported, and specifications against contracts have been coming in at a satisfactory rate. Prices are firm, but without change. We quote steel hoops for forward delivery at 1.50c. to 1.60c., while for prompt shipment as high as 1.65c. is obtainable. Steel bands are 1.40c. to 1.50c. on contracts for forward delivery and 1.60c. to 1.65c. for reasonably prompt shipment, these carrying steel bar card extras.

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Spelter.—The market has shown a further decline in the last few days, and we quote prime grades of Western at 5.05c., East St. Louis, or 5.17½c., Pittsburgh. On a firm offer for any considerable tonnage for prompt shipment, it is probable that 5c., East St. Louis, could be done.

Spikes.—No large orders for spikes are being placed by the railroads, their inquiries being mostly for small lots for prompt shipment, for repair work. None of the spike manufacturers has enough orders for railroad spikes to run to full capacity. The new demand for boat and small railroad spikes is fairly active, and prices are firm. We quote standard sizes of railroad spikes, 4½ x 9-16 in. and larger, at $1.60 to $1.65 for Western shipment and $1.65 to $1.70 for local trade. Boat and small railroad spikes are firm, at $1.75, base, these prices being for carloads and larger lots.

Rivets.—At a recent meeting of the rivet makers held in New York City, prices of 2.15c., Pittsburgh, for structural and 2.25c. for boiler rivets were reaffirmed. However, these prices are sometimes slightly shaded by the smaller makers. The demand is reported moderately active, but consumers are buying mostly in small lots to cover current needs, and are not placing contracts ahead.

Shafting.—There is no falling off in the new demand for shafting, which has been very active for some time, and specifications continue to come in at a liberal rate. In fact, the shafting makers have all the orders on their books they can take care of for some time, and are back in shipments. We are advised that regular discounts of 55 per cent. off in carload and larger lots and 50 per cent. in small lots, delivered in base territory, are being maintained.

Wire Products.—The new demand for wire nails, both from consumers and jobbers, is showing some improvement, and the heavy stocks carried by the latter over the winter months are fast being depleted. New orders and shipments of wire nails by the mills in May showed a material increase over April, and June is expected to be still better. The new demand for cut nails is moderate, being mostly in small lots for early delivery, while specifications against contracts are fairly large. Barb wire and fence wire are moving out more freely, and consumers of fence wire are placing heavy contracts for forward delivery. We quote wire nails at $1.80 in carload and larger lots; galvanized barb wire, $2.10; painted, $1.80; annealed fence wire, $1.60; galvanized, $1.90; cut nails, $1.75 to $1.80, all f.o.b. cars, Pittsburgh, with usual terms, and freight to destination added.

Merchant Pipe.—In our telegraphic report last week we noted the fact that the leading interest had taken about 300 miles of 10 to 18 in. line pipe for a gas line. This order was secured by the National Tube Company from the Arkansas Natural Gas Company and consists of 22 miles of 10-in., 98 miles of 12-in., 99 miles of 16-in. and 50 miles of 18-in. There will be about 31,000 tons of pipe in this contract, and it is the largest single order for line pipe placed in this market for a long time. The contract for laying the gas line has been awarded to Booth & Flinn, Ltd., Pittsburgh, and the line will convey gas from the Shreveport, La., fields to Little Rock, Ark. The main line will run from Caddo Parish, La., to Little Rock. The main branch lines will supply natural gas for domestic use and manufacturing purposes to cities and towns in Arkansas. In addition to the 40 miles of 20-in. line pipe placed by the Ohio Fuel Supply Company with Spang, Chalfant & Co., Inc., the same interest has placed 10 miles of 20-in. with the Youngstown Sheet & Tube Company, Youngstown, Ohio. We note also that the Texas Company, of which John W. Gates is at the head, is in the market for 200 to 250 miles of 8-in. pipe for an oil line. Several other very large lines are being figured on, and if one or two of these should be placed in the near future, which is likely, the three or four pipe concerns that are able to make above 12-in. will be practically filled up on big pipe for the balance of the year. On the butt weld sizes the demand is only fair, and the mills have capacity for more orders than they have on their books at present. Prices on steel pipe are strong, but on iron pipe the regular discounts are sometimes slightly shaded.

Boiler Tubes.—Some very heavy contracts have recently been placed for locomotive tubes with local interests. One maker has secured the tubes for about 60 locomotives to be built by the Chicago & Northwestern and also for 90 locomotives to be built by the Pennsylvania Railroad. All the makers of locomotive tubes are pretty well filled up with orders and have a fair amount of business on their books in merchant tubes, the demand for which is better at present than for some time. Regular discounts on locomotive and merchant tubes are being pretty well maintained.

Coke.—Announcement is made that the Cambria Steel Company has placed a contract for between 15,000 and 20,000 tons of coke per month for two years beginning January 1, at a flat price. The coke will be furnished from the ovens of the Tower Hill Coke Company, the deal being handled by Matthew Addy & Co. of Cincinnati. It is also stated that the Cambria Steel Company has an option on an additional tonnage and is in the market for 6000 tons a month from July to January, which it expects to close within a few days. The output of coke has not shown any material change in the last week, the product of the Upper and Lower Connellsville regions having been 393,185 tons against 396,777 tons in the previous week. We quote standard makes of furnace coke running under 1 per cent. in sulphur for remainder of the year delivery at $1.80 to $1.85 per net ton at oven, but $1.65 to $1.70 is quoted on coke that is loaded on cars and has to be moved. Standard makes of 72-hour foundry coke for last half of the year delivery are held at $2.25 to $2.50 per net ton at oven, a local concern having secured a contract for 300 tons a month running over the remainder of this year at about $2.40 at oven. There are still heavy stocks of coke piled up and it is evident that more coke is being made than the market will take.

Iron and Steel Scrap.—There is a little stronger feeling in heavy steel scrap, owing largely to the fact that the Monessen, Pa., interest is now running its open hearth plant of eight 60-ton furnaces to full capacity, and is again taking in scrap. General inquiry is light, consumers not being interested in the market unless they can get material at bargain prices. Until there is decided betterment in the pig iron market no marked improvement in prices of steel melting scrap can be expected. Dealers quote about as follows, per gross ton, for delivery at Pittsburgh or elsewhere, as noted:

Heavy steel scrap, Steubenville, Follansbee, Sharon, Monessen and Pittsburgh delivery	$15.00 to $15.25
No. 1 foundry cast	14.50 to 14.75
No. 2 foundry cast	13.00 to 13.25
Bundled sheet scrap, at point of shipment	11.00 to 11.50
Rerolling rails, Newark and Cambridge, Ohio, and Cumberland, Md.	16.50 to 16.75
No. 1 railroad malleable scrap	14.50 to 14.75
Grate bars	10.25 to 10.50
Low phosphorus melting stock	19.00 to 19.25
Iron car axles	25.00 to 25.50
Steel car axles	21.00 to 21.50
Locomotive axles	26.50 to 27.00
No. 1 busheling scrap	13.00 to 13.25
No. 2 busheling scrap	9.50 to 9.75
Old car wheels	14.50 to 14.75
Sheet bar crop ends	15.50 to 15.75
Cast iron borings	8.25 to 8.50
Machine shop turnings	9.50 to 9.75

Chicago

FISHER BUILDING, June 1, 1910.—(*By Telegraph.*)

The most important movement in the market during May occurred in bars and structural material. The bolt and screw industries have been large buyers of rods and bars and the agricultural implement people, as previously reported, have covered their requirements for the coming year. In structural material there has been a notable revival in the demand. During May the fabricating interests took contracts which represent a month's operation at full capacity for the entire country. During the last week of the month a fair amount of the pending railroad business was closed and rounded out a good showing for Chicago territory and the West. Prices improved considerably during the month, especially during the past two weeks. Orders for steel cars have supplied the plate and structural mills with a good run of specifications and have apparently checked the tendency to weakness in these lines of finished material. In bars and lighter products there has been no reason for complaint at any time during the winter or spring except in small railroad supplies. Many of the Western railroads had a severe winter and their officials are anxious to restrict operating expenses until June 30, the end of their fiscal year, after which date it is understood that they will be liberal buyers. There have been tentative inquiries already from railroads for bar iron, but the purchasing departments have been deterred by higher authorities from making contracts for the last half of the year and current purchases are of a hand to mouth character. On the whole, business conditions in the West appear very favorable, but without any anxiety on the part of consumers to buy for forward delivery, as the opinion seems to be quite generally held that much higher prices are unlikely in the near future.

Pig Iron.—A few large buyers have purchased round lots during the past week for deliveries extending over the last half, and in one instance into the first quarter of 1911. Basic and malleable Bessemer have been the most active grades, and it is estimated that the total sales for the week in this territory amount to 60,000 tons, including scattering lots of Southern foundry. A local open hearth interest has purchased 10,000 tons of Southern basic, and a leading steel foundry interest has also been in the market and has closed for a considerable tonnage. The details of these transactions are closely guarded, but it is understood that deliveries are generally limited to last half. A St. Louis interest is reported to have bought 5000 tons of basic, on

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which deliveries run through next March. One sale of malleable Bessemer is reported in Milwaukee territory for 5000 tons, and another inquiry is pending for 10,000 tons. Prices are weaker on both Northern foundry and malleable Bessemer, and a Detroit furnace has recently offered iron in this territory under $17, delivered. On Northern grades the market has reached a point where it is encroaching on profits. In Southern foundry iron there is practically no change in the situation. Buyers are generally pursuing an indifferent policy, and in several cases furnaces which have been active in seeking business announce that they have sold all that they desire under $12, Birmingham. For prompt shipment and extending into the third quarter there are several furnaces still selling at $11.50, but the leading brands in this market are held at $12 for last half. A leading Southern interest which has been out of the market for six months, holding a nominal quotation of $15, is now quoting $12, Birmingham, and taking business at that figure. Another leading Southern interest is reported to have sold 31,000 tons during May and has withdrawn lower quotations that were made recently. The following quotations are for June shipment, Chicago delivery:

Lake Superior charcoal	$18.50 to $19.00
Northern coke foundry, No. 1	17.25 to 17.75
Northern coke foundry, No. 2	16.75 to 17.25
Northern coke foundry, No. 3	16.25 to 16.75
Northern Scotch, No. 1	17.75 to 18.25
Southern coke, No. 1	16.10 to 16.60
Southern coke, No. 2	15.85 to 16.35
Southern coke, No. 3	15.60 to 16.10
Southern coke, No. 4	15.35 to 15.85
Southern coke, No. 1 soft	16.10 to 16.60
Southern coke, No. 2 soft	15.85 to 16.35
Southern gray forge	15.10 to 15.60
Southern mottled	14.85 to 15.35
Malleable Bessemer	16.75 to 17.25
Standard Bessemer	18.90 to 19.40
Jackson Co. and Kentucky silvery, 6%	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8%	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10%	21.90 to 22.40

(*By Mail.*)

Billets.—Buyers in this market are generally covered and no transactions are reported.

Rails and Track Supplies.—The demand for light rails is keeping up and there are many inquiries from minor railroads for standard rails. Track supplies continue in good demand, as the Western roads are generally spending money liberally on their track even where they are restricting other purchases. We quote standard railroad spikes at 1.80c. to 1.90c., base; track bolts with square nuts, 2.50c. to 2.60c., base, all in carloads, Chicago. Light rails, 40 to 45 lb., $27; 30 to 35 lb., $27.75; 16, 20 and 25 lb., $28; 12 lb., $29, Chicago.

Structural Material.—The fabricating interests had a very good week and bookings for May have shown up well in the West. Railroad bridge business which has been pending for two or three months is being closed and investors in buildings are also showing confidence in the future. The American Bridge Company took contracts for miscellaneous bridges from the Northern Pacific for 10,000 tons; the Great Northern, 4000 tons; the Great Western 1500 tons; viaduct work for the Soo, 4000 tons; an ore chute for the same road, 400 tons; the Snelling avenue viaduct at St. Paul, for the St. Paul Railroad, 115 tons; bridge work for the Elgin, Joliet & Eastern, 200 tons, and for the Duluth, Missabe & Northern, 100 tons. The Western bookings of the leading interest have been light for several weeks, but these contracts will even up the distribution of work. The same interest has also taken the fabricated work for the Y. M. C. A. Building at Nashville, Tenn., 188 tons. The Worden-Allen Company has taken contracts for about 3300 tons of structural work for the Milwaukee Electric Railway Company. The contract for wharf sheds at New Orleans, 3000 tons, was let to the Fort Pitt Bridge Company, Beaver Falls, Pa. The Millers Ferry bridge at Dallas, Texas, 830 tons, was let to Stupp Brothers, St. Louis. The Barrett Mfg. Company's Building at Chicago, 225 tons, went to the Kenwood Bridge Company. The Old National Bank Building, Oshkosh, Wis., 150 tons, was taken by A. Bolter & Sons, Chicago. Some time ago the Heisen Building in Chicago was reported let to the Cambria Steel Company, but a hitch occurred in signing the contract. It is now reported that Mr. Heisen has purchased the plain material, 4500 tons, from an Eastern mill, and will make a separate contract with a Chicago firm for the fabricating and erecting. We quote plain material from mill, 1.68c. to 1.73c., Chicago; from store, 1.90c. to 2c., Chicago.

Plates.—The market for plates has been rather weak lately and concessions have been reported in prices, but the steel car contracts that were let during May will give the plate mills a good run of specifications. We quote mill prices at 1.68c. to 1.73c., Chicago; store prices, 1.90c. to 2c., Chicago.

Sheets.—There is a fair amount of new business in sheets and the Western market does not seem to be much affected by the concessions reported from Eastern mills. The demand from store continues good. We quote as follows, Chicago: No. 10 annealed, 1.93c.; No. 28 black, 2.58c.; No. 28 galvanized, 3.68c. Prices from store, Chicago, are: No. 10 blue annealed 2.25c. to 2.35c.; No. 28 black, 3c. to 3.10c.; No. 28 galvanized, 4c. to 4.10c.

Bars.—The agricultural implement manufacturers are giving the mills liberal specifications for shipment during the summer. The demand for concrete work is very satisfactory and keeps the hard steel mills booked comfortably ahead, most of them being sold well into July or further. The bar iron market is quiet and there has not been much buying for the third quarter or last half, except by agricultural implement people and wagon manufacturers. Subject to the usual delay in delivery of soft steel bars, we quote as follows: Soft steel bars, 1.63c. to 1.68c.; bar iron, 1.47½c. to 1.52½c.; hard steel bars rolled from old rails, 1.50c. to 1.60c., all Chicago.

Rods and Wire.—The Chicago market does not reflect the weakness reported from other centers in wire products. The jobbing trade in the West seems to be in good condition, and a few jobbers who were disposed to shade prices a month or two ago are understood to have withdrawn concessions they were making. Industrial buyers are coming in for their requirements, especially the bolt and screw people, who are heavy buyers of rods and plain wire. A great deal of the bolt business is done on yearly contracts, especially in the agricultural trade, and the implement people have been buying springs and miscellaneous wire products for their yearly requirements. Jobbers' carload prices, which are quoted to manufacturing buyers, are as follows: Plain wire, No. 9 and coarser, base, 1.83c.; wire nails, 2.03c.; painted barb wire, 2.03c.; galvanized, 2.33c., all Chicago.

Merchant Steel.—The implement manufacturers are specifying early for their special lines of agricultural steel, and there is a notable tendency to specify for longer periods and thus give the mills longer runs on special shapes. The general demand for merchant steel continues very satisfactory.

Cast Iron Pipe.—The leading interest has received lettings for 1000 tons of water pipe for the city of Portland, Ore., and 500 tons for Kansas City, Kan. There is a fair run of orders from smaller municipalities, and the gas companies are furnishing good specifications. On current business we quote, per net ton, Chicago, as follows: Water pipe, 4-in., $28.50; 6 to 12 in., $27.50; 16-in. and up, $26.50, with $1 extra for gas pipe.

Old Material.—Consumers have been coming into the market during the past 10 days to take advantage of the bargains that are available at the present level of prices. This has given a healthy tone to the trade and enables the dealers to move practically everything that they have in transit. There has not been enough buying to make any change in prices, but the demand is pretty well distributed throughout the list. Steel angle bars are in especially good demand and bring a substantial premium over melting steel. The malleable foundries would contract for round lots if dealers would sell short at present prices, but market conditions would not justify short sales as prices are now at a very low level in relation to the values of finished material. Following prices are per gross ton, delivered, Chicago:

Old iron rails	$17.00 to $17.50
Old steel rails, rerolling	17.00 to 17.50
Old steel rails, less than 3 ft	15.00 to 15.50
Relaying rails, standard sections, subject to inspection	24.00 to 25.00
Old car wheels	15.50 to 16.00
Heavy melting steel scrap	13.50 to 14.00
Frogs, switches and guards, cut apart	13.50 to 14.00
Shoveling steel	13.00 to 13.50

The following quotations are per net ton:

Iron angles and splice bars	$15.00 to $15.50
Iron car axles	20.00 to 20.50
Steel car axles	20.00 to 20.50
No. 1 railroad wrought	12.75 to 13.25
No. 2 railroad wrought	11.75 to 12.25
Springs, knuckles and couplers	12.50 to 13.00
Locomotive tires, smooth	17.50 to 18.00
No. 1 dealers' forge	11.00 to 11.50
Steel axle turnings	9.50 to 10.00
Machine shop turnings	8.00 to 8.50
Cast and mixed borings	5.00 to 5.50
No. 1 busheling	10.50 to 11.00
No. 2 busheling	8.00 to 8.50
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
No. 1 cast scrap	13.00 to 13.50
Stove plate and light cast scrap	11.00 to 11.50
Railroad malleable	12.50 to 13.00
Agricultural malleable	11.50 to 12.00
Pipes and flues	9.50 to 10.00

Metals.—There is a little better demand for copper and a fair amount is being sold in this territory. The foundries which sell to the automobile trade are still behind on their deliveries and have become relatively large consumers and there is good inquiry from other industries. Tin continues to hold steady within a narrow range of fluctuations. Spelter is practically unchanged in the Chicago market. We

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quote Chicago prices as follows: Casting copper, 12⅞c.; lake, 13⅛c., in carloads, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 33¾c.; small lots, 35c.; lead, desilverized, 4.30c. to 4.35c., for 50-ton lots; corroding, 4.55c. to 4.60c. for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.30c. to 5.35c.; Cookson's antimony, 10⅜c., and other grades, 9¾c. to 10¼c.; sheet zinc is $7.50 f.o.b. La Salle, in carloads of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13c.; copper bottoms, 11c.; copper clips, 12¼c.; red brass, 12c.; yellow brass, 9½c.; light brass, 7c.; lead pipe, 4¼c.; zinc, 4.40c.; pewter, No. 1, 24c.; tin foil, 26c.; block tin pipe, 30c.

Philadelphia

PHILADELPHIA, PA., May 31, 1910.

Conditions influencing the market are being closely observed by both buyers and sellers. Inquiries for testing purposes are being freely made and consumers are more disposed to place orders for at least a portion of their future requirements. No definite price concessions are to be noted, although it is believed that minor reductions, particularly in pig iron, might be had under certain circumstances. The movement in finished materials has not been particularly active, although the production for the month will be larger than anticipated. A good volume of new business is being figured on. The old material market has a trifle better tone, although business is dull. Furnace coke is a shade stronger, while foundry coke is less firm.

Pig Iron.—While there has been a fair volume of business, it is the increased number of inquiries, particularly for near future and extended delivery, which have developed from consumers in this territory, in the vicinity of New York and in New England that have given the market a somewhat better tone. Inquiries for fairly good sized blocks of iron for last half delivery are more pronounced, and some business of this character has been placed at the same range of prices which have recently prevailed for prompt iron. Reports that these figures are occasionally being shaded continue to crop out. Sales of moderate lots for third quarter delivery have been made at a small concession, but usually these have been less well known makes, standard brands being pretty firmly held at $17, minimum, for No. 2 X foundry, although it is not unlikely that some makers would meet the concessions if the business under consideration was particularly desirable. It is conceded, however, that the present selling prices are extremely close to cost, and that any lower level would probably be but a temporary one. The cast iron pipe foundries have again been active buyers and will take additional tonnage if their views as to prices are met. Transactions aggregating some 7000 tons, mostly for near future delivery, are reported, in which Southern No. 4, gray forge and Northern low grade analysis iron figured. Several sales of 1000 ton blocks of Northern No. 2 X foundry for last half delivery have been made at prices which would equal $17, delivered in this immediate vicinity. A good volume of orders in lots running from carloads to a few hundred tons is also to be noted, these being for the most part for prompt and near future shipment, indicating apparently that the majority of consumers have but light stocks on hand. The movement in Virginia grades is less active, and it is stated that $14, furnace, for No. 2 X foundry for New England delivery has been done. The majority of the sellers are firm at $17 to $17.25, delivered in this territory, for that grade. Forge iron has not been particularly active; some small lots have been sold at a basis of $15, furnace, equal to $15.75 to $16, delivered, according to destination. A little interest has been shown in basic iron, the demand being principally for small lots. The larger consumers have not yet entered the market, being covered largely for third quarter and hardly prepared to take on fourth quarter iron. This grade, in the absence of business, is nominally quoted at $16.25, delivered, but this price could easily be shaded 25 cents a ton on any sizable business. Low phosphorus iron is in better demand; one inquiry for about 5000 tons for last half shipment is before the trade, while sales of moderate lots have been made to steel casting makers at $23 to $23.25, delivered. The following range of quotations is named for standard brands, delivery in buyers' yards in this territory, for either prompt or last half shipment:

Eastern Pennsylvania, No. 2 X foundry	$17.00
Eastern Pennsylvania, No. 2 plain	$16.50 to 16.75
Virginia, No. 2 X foundry	17.00 to 17.25
Virginia, No. 2 plain	16.75 to 17.00
Gray forge	15.75 to 16.00
Basic	16.25
Standard low phosphorus	23.00 to 23.25

Ferromanganese.—Consumers in this territory show no interest in the market. Some business has, however, been done for Western delivery, and prices are a shade easier, $40, Baltimore, being named for delivery during the second half.

Billets.—The demand has been rather quiet, buyers showing a disposition, when large tonnages are being considered, to await further developments before placing orders. A fair amount of current business in small lots is being done, particularly in forging billets. Mills are still quite actively engaged, and specifications are coming out freely. Standard basic open hearth rolling billets are quoted at $29 to $30, delivered in this vicinity, which might be shaded on less well-known makes. Forging billets are firm, at $32, Eastern mill, the usual extras applying.

Plates.—Mills in this district are taking a better volume of orders, and several report that the month's business will show an improvement over its predecessor. Specifications on contracts are heavier, and there is a very satisfactory run of miscellaneous orders. Some good tonnages in bridge and structural plates are being figured on, and more business in boat plates is in sight. Makers are inclined to look more favorably on the prospect for future business and are maintaining prices at 1.70c., minimum, for ordinary plates, delivered in this vicinity.

Structural Material.—Several fair sized building contracts have been taken by fabricators in nearby cities, ranging from 500 to 1200 tons, but the bulk of the building has been in small tonnages. A fair amount of bridge material is being figured on. Sharp competition on fabricated and erected work continues. Some variation in the activity of makers is to be noted, as a result of which prices are irregular, 1.60c. to 1.70c., according to specification, being named for plain shapes delivered in this territory.

Sheets.—A good current demand for moderate lots is reported. Prompt deliveries on some grades are hard to obtain, except at a premium. Mills are operating at full capacity and the outlook for continued activity is favorable. Prices are unchanged, ranging as follows for reasonable prompt shipment: Nos. 18 to 20, 2.80c.; Nos. 22 to 24, 2.90c.; Nos. 25 and 26, 3c.; No. 27, 3.10c.; No. 28, 3.20c.

Bars.—There is a fair amount of business being done in refined iron bars, which for early shipment are quoted at 1.52½c. to 1.57½c., delivered in this territory. A strong demand for steel bars continues; prices are firm at 1.60c., delivered, and some makers are able to make a trifle better deliveries on some sizes.

Coke.—Furnace coke appears somewhat stronger, due, no doubt, to the sharp curtailment in production. Makers have recently turned down offers of $1.60 and $1.65, at oven, and are holding more firmly at the top of the market, $1.80 to $1.85, for either prompt or second half delivery. Foundry coke is not quite so strong; $2.25 to $2.50, at oven, can easily be done for second half shipment, and prompt coke has been offered down to $2.10. Sales during the week have been irregular, the following range of prices per net ton being named for delivery in buyers' yards in this vicinity:

Connellsville furnace coke	$4.00 to $4.15
Foundry coke	4.50 to 4.75
Mountain furnace coke	3.60 to 3.75
Foundry coke	4.10 to 4.35

Old Material.—While there has been very little business transacted, a slightly better feeling prevails among merchants, who are inclined to believe that bottom prices have been reached. The heavy melting steel situation is unchanged; the buyer for the associated steel mills has been taking on small lots of material, while one outside mill would take tonnage at $14, delivered. Sellers, however, are not inclined to let go under $15, although good scrap might be had in limited amounts at $14.50. A little better movement in wrought turnings is reported, and some interest is being shown in stove plate. Quotations are still largely nominal, those representing the range at which business could probably be done for prompt delivery in buyers' yards being as follows:

No. 1 steel scrap and crops	$14.50 to $15.00
Old steel rails, rerolling	16.75 to 17.25
Low phosphorus	20.50 to 21.00
Old steel axles	20.50 to 21.50
Old iron axles	26.50 to 27.50
Old iron rails	20.00 to 20.50
Old car wheels	15.00 to 15.50
No. 1 railroad wrought	17.00 to 17.50
Wrought iron pipe	15.00 to 15.50
No. 1 forge fire	12.50 to 13.00
No. 2 light iron	8.50 to 9.00
Wrought turnings	9.50 to 10.00
Cast borings	8.00 to 8.50
Machinery cast	15.00 to 15.50
Railroad malleable	14.50 to 15.00
Grate bars	12.50 to 13.00
Stove plate	10.00 to 10.50

Italy Approves of Steamship Subsidies.—The maritime conventions, providing for a $6,000,000 subsidy in aid of Italian shipping and a 25-year subvention to the Italian Lloyd Steamship Company for the transportation of mail, were approved May 28 in the Chamber of Deputies, with certain limitations, by a majority of 282.

THE IRON AND METAL MARKETS

Cleveland

CLEVELAND, OHIO, May 31, 1910.

Iron Ore.—The market is lifeless. No inquiries are coming in and merchant firms do not look for much in the way of additional orders until late in the season. Shipments down the lakes are heavy, but as many furnace interests are not ready to take their ore a large share of the tonnage is being placed on docks, where the space is quite limited, owing to the large stocks on hand at the opening of navigation. Prices are firm. We quote as follows, per gross ton: Old Range Bessemer, $5; Mesaba Bessemer, $4.75; Old Range non-Bessemer, $4.20; Mesaba non-Bessemer. $4.

Pig Iron.—The interest that has been aroused in the market among consumers of foundry grades, as noted last week, has kept up, and a larger volume of inquiries has come out. So far these have not resulted in very much business, but the situation looks favorable for quite an active buying movement within the next few days. One interest reports the sale of one block of 1000 tons during the week and several smaller lots. Buyers are carefully studying the market before placing orders, apparently not being quite fully decided that now is the time to buy. Some, in sending in inquiries, state that they will need a specified tonnage to complete their last half requirements, and that they will be governed by the quotations made, whether to buy now or wait until later. The largest inquiry is from a Barberton, Ohio, manufacturer, who wants 5000 tons of analysis iron running from 1.80 to 2 in silicon and under 0.04 in sulphur. This and smaller inquiries in this territory aggregate from 12,000 to 15,000 tons. There is an inquiry from Erie, Pa., for 500 to 800 tons. A few fair inquiries for malleable iron have come out, and an Illinois implement manufacturer is asking for prices on 1000 tons of Bessemer for the first quarter of 1911. While prices are no better, there seems to be a disposition among some of the low sellers to stop making the minimum quotations that are prevailing. The ruling quotation, however, for No. 2 foundry continues at $15, Valley furnace, both for spot shipment and for delivery through the last half. Local prices for early delivery have been reduced about 25c. to shut out Valley competition. The Southern iron market is firmer, and $12, Birmingham, is the minimum quotation for No. 2 for the last half. We note the sale of two lots of No. 2 Southern, each of 500 tons, to local foundries for the last half. The new furnace of Corrigan, McKinney & Co., in Cleveland, was blown in May 28 on foundry iron. For early delivery we quote, delivered, as follows:

Bessemer	$16.90
Northern foundry, No 1	$16.25 to 16.50
Northern foundry, No. 2	15.75 to 15.90
Northern foundry, No. 3	15.25 to 15.50
Gray forge	15.90
Southern foundry, No. 2	16.10 to 16.35
Jackson Co. silvery, 8 per cent. silicon	20.50 to 21.00

Coke.—Foundrymen, as a rule, are not ready to contract for their last half requirements, thinking that prices may go lower, and many have enough under contract to last them through a portion of the last half. Only an occasional contract is reported. We quote standard Connellsville furnace coke at $1.70 to $1.75 per net ton, at oven, for spot shipment and $1.80 to $1.90 for the last half. Connellsville 72-hour foundry coke is held at $2.15 to $2.30 for spot shipment and $2.25 to $2.50 on contract.

Finished Iron and Steel.—The general feeling in the trade is satisfactory, and some of the mill agencies report an improvement in the volume of orders. The structural situation is very satisfactory. A good run of orders for small lots is coming out and regular prices are being maintained. The contract for the structural steel work in the new plant of the Firestone Tire & Rubber Company, Akron, Ohio, about 2000 tons, has been awarded to the Riverside Bridge Company, Wheeling, W. Va. The only new inquiry of any size is for 2000 tons for the Nickel Plate Railroad, to be used for bridges in connection with track elevation in East Cleveland. A new power plant to be erected by the Cleveland Electric Illuminating Company will require about 2000 tons. Several building contracts in this city involving considerable tonnage are still pending. Specifications on steel bar contracts are good. A few of the implement makers in this territory have not yet placed contracts. One mill agency is making these contracts for a year, but others are not selling for delivery beyond January 1. Steel bars are firm at 1.45c., Pittsburgh. The demand for twisted concrete bars is active. The demand for small lots of plates is good. Carload lots for early delivery are being sold at 1.55c., Pittsburgh, and larger lots 1.50c. Quotations of 1.45c. are being made by a few of the smaller mills that make a limited range of sizes. The new demand for sheets is only fair, but mills report a good volume of specifications on contracts. Prices are fairly firm at the usual concession of $2 a ton on established prices. The demand for light rails in carload lots is fair and prices are well maintained. Local bar iron mills are well filled with orders, but only a limited amount of new business is coming out. We quote iron bars at 1.45c. to 1.50c., Cleveland. The Carnegie Steel Company has received an order from the Cleveland Railway Company for 4100 steel ties. Warehouse business with jobbers continues good.

Old Material.—Yard dealers seem eager to buy scrap to hold for better prices, which they feel are bound to come next fall if not earlier, and in some cases are said to be offering better prices than the mills are willing to pay at the present time. Not much material, however, is being offered for sale. The demand from the mills continues light, the only sales reported being small lots. In spite of the increased activity among dealers, prices are still weak and a decline is noted in several grades. The Pennsylvania lines, West, have a list out of 1000 tons to be closed June 2. Dealers quote, per gross ton, f.o.b. Cleveland, as follows:

Old steel rails	$15.50 to $16.00
Old iron rails	17.00 to 17.50
Steel car axles	21.00 to 21.50
Heavy melting steel	13.75 to 14.25
Old car wheels	14.50 to 15.00
Relaying rails, 50 lb. and over	22.50 to 23.50
Agricultural malleable	13.00 to 13.50
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	10.00 to 10.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$21.50 to $22.00
Cast borings	7.00 to 7.25
Iron and steel turnings and drillings	8.00 to 8.50
Steel axle turnings	10.00 to 10.50
No. 1 busheling	12.00 to 12.50
No. 1 railroad wrought	14.50 to 14.75
No. 1 cast	12.75 to 13.25
Stove plate	11.00 to 11.50
Bundled tin scrap	11.00 to 11.50

William F. Bonnell and J. E. Rawson, who were formerly engaged in the iron and steel brokerage business in Cleveland under the name of Otis, Bonnell & Co., have reembarked in that line of business and have opened an office at 413 Cuyahoga Building under the style of William F. Bonnell & Co. They will handle the crucible tool steel products of the Braeburn Steel Company, Braeburn, Pa., steel pipe and railroad equipment of all kinds.

Cincinnati

CINCINNATI, OHIO, June 1, 1910.

The month closes with a firmer tone in the iron markets than was predicted when it opened. There appear to be more restrictions thrown about the minimum price on both Northern and Southern irons. Jobbing interests in the finished lines report business quite satisfactory and coke has been a trifle more active. The stove making interests are beginning to awaken to last half necessities. Old material is without change.

Pig Iron.—The tone of the Southern market is considerably firmer, and it appears that Birmingham irons of standard quality are rather fixed on the $12 basis. The opportunities for $11.50 iron are gradually disappearing, although one or two makers evidence a willingness to name this price on acceptable tonnage in desirable territory. Low grades are still scarce and at a premium, No. 4 foundry and forge at $11, Birmingham, being about the minimum price this week. Some mottled was sold at $10.75, Birmingham. The largest inquiry heard to-day in this market is for 5000 tons of foundry iron for last half, from northern Ohio territory. This inquiry is considered rather more in the nature of a feeler, however. Another melter in northern Ohio would buy 2000 to 3000 tons of No. 4 foundry for third quarter, and this is probably being negotiated with a nearby furnace interest. A large Indiana stove works has an inquiry out for 500 tons of No. 2 foundry for last half. A local user of malleable, who bought 500 tons last week, would take probably as much more at an acceptable price. It is reported that the central Ohio inquiry for low phosphorus iron is still in negotiation, as is also the inquiry of the prominent Ohio stove maker, who wanted 400 tons per month for the last half, unless the latter bought of a nearby furnace interest. Consumers are still trying to get better prices and some analysis iron has, it is understod, gone at concessions of 25c. at least below the $12 figure. While Northern irons are quotable at $15.50, Ironton, for last half, it appears that some $15 business has been contracted during the week. Although the majority of the Birmingham interests adhere rigidly to $12 for last half, at least one of these makes the third quarter the limit and refuses to quote beyond that figure. Some charcoal irons have been sold into Pittsburgh territory, the price being about $22.50, Birmingham. There is no interest in high silicons. Some ferrosilicon is in negotiation on the basis of $23 for 10 per cent., advancing in $1 units. One Southern furnace interest accredited with

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$11.50 business announces to-day that nothing less than $12 will be considered, and anything over 200 tons, unless previously awarded, must be submitted. For prompt delivery and extending over the next four or five months, based on freight rates of $3.25 from Birmingham and $1.20 from Ironton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$15.25 to $15.75
Southern coke, No. 2 foundry	14.75 to 15.25
Southern coke, No. 3 foundry	14.50 to 14.75
Southern coke, No. 4 foundry	14.25 to 14.50
Southern coke, No. 1 soft	15.25 to 15.75
Southern coke, No. 2 soft	14.75 to 15.25
Southern gray forge	14.25
Ohio silvery, 8 per cent. silicon	19.70
Lake Superior coke, No. 1	16.70 to 17.20
Lake Superior coke, No. 2	16.20 to 16.70
Lake Superior coke, No. 3	15.70 to 16.20
Standard Southern car wheel	25.25 to 25.75
Lake Superior car wheel	22.25 to 22.75

(*By Mail.*)

Coke.—There has been a little more contracting by furnaces, and some inquiries are accumulating for last half supplies. Foundry coke shows a little improvement, and some melters are contracting for their year's supply from July 1. Connellsville foundry grades are quoted from $2.15 to $2.50 per net ton at oven for spot delivery, and contracts are written on the average at about $2.50 to $2.75. Connellsville furnace brands are selling at $1.65 to $1.80 for early delivery and on contract $1.80 to $2. Wise County furnace grades are selling at $1.75 to $2 for spot shipment and forward deliveries are regulated by a sliding scale; foundry grades are quotable at $2.25 to $2.50 for any delivery. There is no change in Pocahontas prices, furnace cokes selling at about $1.85 for early and for $1.90 to $2 forward delivery; foundry cokes are quoted at about the same as Wise County of the same grades.

Finished Iron and Steel.—Business is light in structural steel and tank plates, but better in boiler plate. Structural steel and plates are quoted at 1.50c., Pittsburgh, and out of stock, 1.90c., the latter price firm. Steel bars are quoted here at 1.45c., Pittsburgh. Iron bars are quiet at 1.50c., Cincinnati; out of stock, 1.75c. Large local dealers note a falling off in specifications on mill shipments, but warehouse business continues excellent. While it is generally admitted that some business is being placed at current prices to January 1, representatives of independent mills emphatically deny that they are selling a pound for delivery at these prices beyond October 1. Business on blue annealed sheets, especially Nos. 10 to 16, is reported excellent and deliveries are more remote; but on black and galvanized the mills are catching up. The demand for twisted steel bars for concrete work continues excellent. Engineers, architects and builders announce that the late summer and fall will see a number of important building projects taking shape.

Old Material.—Offerings of scrap from the railroads and other sources have been unusually large during the month. Bidding has not been nearly so spirited in this market as usual. The larger dealers are all carrying immense stocks now, and, while all are buying, they are doing so conservatively. Mills are not yet evidencing any special interest in melting steel, and the low prices quoted by dealers seemingly have not been effective. The more conservative of the larger dealers believe that they will be well paid for carrying stocks and are showing no concern over the situation. For delivery in buyers' yards, Cincinnati and southern Ohio, we quote nominal prices as follows:

No. 1 railroad wrought, net ton	$12.00 to $13.00
Cast borings, net ton	5.50 to 6.50
Heavy melting steel scrap, gross ton	11.50 to 12.50
Steel turnings, net ton	6.50 to 7.50
No. 1 cast scrap, net ton	12.00 to 13.00
Burnt scrap, net ton	9.00 to 10.00
Old iron axles, net ton	16.00 to 17.00
Old iron rails, gross ton	17.50 to 18.00
Old steel rails, short, gross ton	15.00 to 15.50
Old steel rails, long, gross ton	15.00 to 15.50
Relaying rails, 56 lb. and up, gross ton	23.00 to 24.00
Old car wheels, gross ton	13.00 to 13.50
Low phosphorus scrap, gross ton	16.00 to 16.50

Birmingham

BIRMINGHAM, ALA., May 30, 1910.

Pig Iron.—For the past two weeks, particularly, it has been more or less a game of "see-saw" with buyers and sellers—the one giving reasonable assurance that $11.50, Birmingham, would be interesting and might be an inducement for the placing of a substantial tonnage for shipment the remainder of the year; the other, from all indications, expressing a willingness to meet such conditions on a basis of $12, Birmingham. The result has been that indications point to the fact that sellers have come to the conclusion that a safe level has been reached on a $12 basis and that contracts placed at that price are more than likely to be a safe buy. A majority of the furnace interests have expressed their intentions of putting their stacks out of blast rather than deviate from the $12 base. Another encouraging feature of the situation is the continued increased interest manifested by buyers. Some inquiries are being received, carrying with them a proposition to buy on the $11.50 basis, but they are being met by refusals. A very satisfactory tonnage is reported booked the past week, though not quite as large as the week previous. The month of May will easily show a 20,000-ton reduction in output as compared with the month of April—merchant and non-merchant iron; the greatest percentage of reduction, however, will be shown in the merchant iron. Southern charcoal iron is quoted at $22.50 at the furnace.

Cast Iron Pipe.—The principal transactions involving water pipe tonnage during the week just past consisted of small lots, and manufacturers report the aggregate volume satisfactory. Of course they realize that, with the unsettled conditions that have attended the pig iron market for some time, there is little hope for large business until actual "daylight" is seen. With continued better feeling in pig iron circles they hope for a revival of cast iron pipe business to normal. Authorized quotations on water pipe are as follows, per net ton, f.o.b. cars here: 4 to 6 in., $23; 8 to 12 in., $22; over 12 in., average $21, with $1 per ton extra for gas pipe.

Old Material.—The scrap business is exceedingly slack. One of the large dealers here reports that his principal in the East refuses to accept and pile additional stock on account of no room and lack of customers. The demand for scrap in the South is limited; hence when the Eastern and Western foundries slacken in their demand a heavy damper is thrown on the scrap iron situation here. Following nominal prices are asked by dealers here, per gross ton:

Old iron axles	$17.00 to $17.50
Old iron rails	13.00 to 13.50
Old steel axles	16.50 to 17.00
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	9.50 to 10.00
No. 1 country wrought	9.00 to 9.50
No. 2 country wrought	8.50 to 9.00
No. 1 machinery	10.50 to 11.00
No. 1 steel	9.50 to 10.00
Tram car wheels	10.00 to 10.50
Standard car wheels	11.50 to 12.00
Light cast and stove plate	7.50 to 8.00

Ward W. Jacobs, president of the Shelby Iron Company, is here from Hartford, Conn., looking over the properties of the company.

The officials of the Southern Iron & Steel Company advise that the new nail and rod mill machinery has about worn off its rough edges and is in first-class condition for steady work.

St. Louis

ST. LOUIS, MO., May 30, 1910.

Coke.—Merchant sellers of coke are doing some business in carload lots and upward, for which there is a daily demand, but the agencies are not making any large sales at present, though there is a moderate amount of inquiry from parties whose contracts expire July 1. One house reports a sale of 18 cars of special coke and another of 10 cars. The market holds steady at previous quotations: 72-hour standard Connellsville foundry, $2.35 for prompt and $2.50 for contract, per net ton, f.o.b. oven.

Pig Iron.—While some of the leading offices report business very dull, in fact one of the largest sold but 100 tons during the week and the representative of a large Southern company booked but one small order, two other agencies and a merchant seller reported considerable business. There are also several large inquiries out, mainly for basic, aggregating 20,000 tons. Among the sales mentioned were the following: 2000 tons Southern foundry to a local manufacturer, shipment over the second half; between 3000 and 4000 tons, principally basic, for shipment over the second half and last quarter; 600 tons high silicon, shipment over six months. A prominent member of the trade, who has just returned from the South, states that conservative Birmingham furnacemen claim that prices have reached a point where it is no object to take most of the business offered, and believe that some sales have been made at a loss, both in their district and in Ohio. Though it is likely some contracts have been on the basis of $11.50, Birmingham, for No. 2 foundry, this iron is not offered except for prompt shipment at that figure. The favorable feature in this market consists in the fact that all the large steel foundries are very busy. The tone of the market is firmer, but prices show no change. We quote No. 2 Southern foundry at $11.50 for prompt and $12 for shipment over the second half, f.o.b. Birmingham.

Finished Iron and Steel.—The leading interest reports a fair demand for standard rails, but the inquiry for light rails, owing to labor troubles in the mining districts, is quiet. For structural steel there is a moderate inquiry, mostly from outside fabricators. Bars are in excellent demand, while for

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all lines of track material there is a steady and satisfactory business doing.

Lead, Spelter, Etc.—Lead is strong, with 4.25c. bid for Missouri; special brands held higher. Spelter is dull and nominal at 5.17½c., East St. Louis. Tin is 30c. per 100 lb. higher; antimony and copper remain unchanged. The demand for finished metals the past week ruled excellent.

Old Material.—Leading sellers report a firm but dull market. They are looking for an improvement in the near future in the demand for steel scrap. Stocks are moderate and there were no offerings last week by the railroads. While there are no changes reported in prices, there is a firmer feeling, at least for steel scrap. We quote dealers' prices as follows, per gross ton, f.o.b. St. Louis:

Old iron rails	$15.00 to $15.50
Old steel rails, rerolling	15.00 to 15.50
Old steel rails, less than 3 ft	13.50 to 14.00
Relaying rails, standard sections, subject to inspection	26.00 to 26.50
Old car wheels	15.00 to 15.50
Heavy melting steel scrap	13.50 to 14.00
Frogs, switches and guards, cut apart	13.50 to 14.00

The following quotations are per net ton:

Iron fish plates	$14.00 to $14.50
Iron car axles	21.00 to 21.50
Steel car axles	19.50 to 20.00
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	12.50 to 13.00
Railway springs	12.00 to 12.50
Locomotive tires, smooth	16.50 to 17.00
No. 1 dealers' forge	11.00 to 11.50
Mixed borings	6.50 to 7.00
No. 1 busheling	11.50 to 12.00
No. 1 boilers, cut to sheets and rings	9.50 to 10.00
No. 1 cast scrap	12.00 to 12.50
Stove plate and light cast scrap	9.50 to 10.00
Railroad malleable	11.25 to 11.75
Agricultural malleable	10.00 to 10.50
Pipes and flues	9.25 to 9.75
Railroad sheet and tank scrap	8.50 to 9.00
Railroad grate bars	9.50 to 10.00
Machine shop turnings	9.50 to 10.00

The Curtis & Co. Mfg. Company is making extensive additions to its plant which will result in doubling its capacity.

The Rock Island Pulverizer Company, Rock Island, Ill., has been incorporated to engage in general manufacturing of milling and mining machinery; capital stock, $100,000; incorporators, Robert Forsythe, Wallace W. Wiegand and W. G. Xander.

The Rayfield Motor Car Company, Springfield, Ill., has been incorporated to manufacture and deal in automobiles, accessories and supplies; capital stock, $150,000; incorporators, J. F. Miller, E. E. Stanley and Burke Vancil.

The contract for 269 miles of pipe to be used in bringing natural gas to St. Louis from the Caddo, La., fields has been placed by the Busch-Everett-Walker syndicate with the Booth & Flinn Company, Pittsburgh. The order amounts to about $4,500,000, the pipe alone costing $2,000,000, exclusive of couplings, fittings, valves, river lines, a compressing station and the building of lines through towns not already piped.

The Illinois Traction Company is investing $8,000,000 in improvements this year, of which $3,000,000 will be devoted to passenger and freight stations and facilities in St. Louis. Formal announcement has been made of the erection of a 12-story office building and terminal station at Twelfth and Lucas streets.

The American Car Company has booked orders from the Illinois Traction Company for eight coaches 57 ft. in length and for five parlor type trailers. Orders will soon be placed for two new sleepers.

The Chicago, Burlington & Quincy Railway Company will build a double track bridge to span the Missouri River at Kansas City, to replace the old Hannibal bridge which the railroad company is now using.

The East Side Belt Railway & Terminal Association has been incorporated at Springfield, Ill., for the purpose of building a belt line terminal system on the outskirts of East St. Louis.

Buffalo

BUFFALO, May 31, 1910.

Pig Iron.—Heavy sales have been made during the week at prices from 25c. to 50c. per ton under last week's quotations. One interest alone sold about 40,000 tons of foundry irons and 1000 tons of malleable. In consequence of the heavy bookings during the past few weeks most producers in this district are pretty well sold up, a fact which will undoubtedly operate to make any further cut in prices improbable, as furnacemen are not now so eager for business. The quotations given below indicate as closely as possible the basis upon which present business is being taken for delivery over the remainder of the year, per gross ton, f.o.b. Buffalo, or at furnace:

No. 1 X foundry	$16.00 to $16.50
No. 2 X foundry	15.50 to 16.00
No. 2 plain	15.25 to 15.75
No. 3 foundry	15.00 to 15.50
Gray forge	15.00 to 15.50
Malleable	15.75 to 16.25
Basic	15.75 to 16.50
Charcoal	19.25 to 19.75

Finished Iron and Steel.—Reports from the principal mill agencies and mills in this district indicate that the total volume of business placed during May in the several lines of finished products was not as large as for the preceding month, although made up of a larger number of individual orders. The aggregate of the tonnage of business booked during the first quarter of the year, however, exceeded that of any like period in the history of most of the local selling agencies. The demand continues fairly active in all lines, although there are indications that in some instances buyers are holding back awaiting developments and not placing orders for full requirements. There has been no change in prices except for heavy sheets and universal mill plates, prices for which are somewhat softer. There is a fair amount of inquiry for fabricated material, but a number of projects have been held back for revised specifications and refiguring before the placement of contracts. Bids are to be received shortly for the steel for new machine shops for the Niagara Machine & Tool Works, this city, about 300 tons; also for the steel for the Simonds Mfg. Company's new plant at Lockport, N. Y., about 600 tons; for 100 tons for the Gibbs manufacturing and garage building, Buffalo, and for steel for a new hotel at Erie, Pa. The Lackawanna Bridge Company, Buffalo, has been awarded contract for the structural steel for the two new blast furnaces to be erected at South Buffalo by the Rogers-Brown Iron Company, about 1000 tons.

Old Material.—But little change is to be noted from the conditions reported last week, there being very little demand from consumers, who are maintaining a waiting attitude. Dealers are accumulating stocks from such offerings as are made at low figures and holding for higher prices. The aggregate of such transactions is light, however. Prices are not quotably changed and are as follows, per gross ton, f.o.b. Buffalo:

Heavy melting steel	$13.50 to $14.00
Low phosphorus steel	18.50 to 19.00
No. 1 railroad wrought	15.50 to 16.00
No. 1 railroad and machinery cast scrap	14.50 to 15.00
Old steel axles	18.00 to 18.50
Old iron axles	22.75 to 23.25
Old car wheels	15.00 to 15.50
Railroad malleable	15.00 to 15.50
Boiler plate	12.00 to 12.50
Locomotive grate bars	11.50 to 12.00
Pipe	11.50 to 12.00
Wrought iron and soft steel turnings	7.25 to 7.75
Clean cast borings	6.00 to 6.50
No. 1 busheling scrap	12.50 to 13.00

San Francisco

SAN FRANCISCO, CAL., May 25, 1910.

While activity in some lines of steel products continues above normal, the continued quietness in several departments is rather discouraging. Structural material has been in but moderate demand for the last month, and the comparatively small amount of work in view for the immediate future gives little promise of any general activity during the summer. Jobbing trade on all finished products in San Francisco is very quiet, as local interests are reluctant to order in large quantities on account of unsettled labor conditions. A better feeling prevails in other parts of the State, and mill representatives returning from the interior report a good general demand in the central valley as well as at Los Angeles. There is a fair inquiry for small merchant pipe from outside interests, though the local plumbers' supply trade is extremely dull. Wire nails are in less demand than a year ago. Oil pipe and tank plates are moving freely, though no exceptionally heavy orders have been placed. The tonnage of bars is increasing, with fair bookings by domestic rolling interests, notwithstanding the heavy importations for local jobbers.

Plates.—The heavy orders placed in this department within the last two months are not often duplicated, and no additional business of unusual magnitude has been transacted. The tonnage, however, is still somewhat above normal, with numerous inquiries for tank and riveted pipe construction to be carried on during the summer and fall. Several new projects are coming up which will require considerable work of both descriptions, including plans by several oil interests for storage facilities both in the oil fields and on tidewater. An inquiry from the Government is expected shortly for oil tanks at the Pacific Coast navy yards. The Richmond Light & Power Company is planning a large gas plant at Richmond, Cal. The city of Los Angeles has ordered 1800 ft. of 14-in. riveted pipe.

Rails.—Several large lots of light rails have been im-

THE IRON AND METAL MARKETS

ported recently by jobbing interests and orders placed with domestic mills have accordingly been light. Little of the foreign material is being ordered at present, though some is said to be in transit, and there is a rather large supply in stock. The demand for light rails has been quiet, but is now about normal. Frequent inquiries for standard rails continue to come from the logging interests of California as well as the North Pacific district, though few orders are of much importance. Several electric railroads are also in the market for small lots.

Bars.—The general distributive movement of bars in the interior of California is highly satisfactory to local merchants, who are using foreign material to fill most of the demand. A heavy tonnage is in transit from Europe for this coast and many merchants have placed orders which it is estimated will carry them to the end of the year, if not into 1911. It is reported that foreign orders have also been placed by some of the larger manufacturers in the interior of California, though these interests are also buying a considerable tonnage from domestic mills. Foreign bars are offered for delivery at San Francisco at 1.85c. Bars from store, San Francisco, are quoted at 2.50c. for steel and 2.30c. for iron.

Structural Material.—Recent structural contracts are few and of small importance, work in San Francisco being especially quiet. The Spring Valley school contract, requiring about 250 tons, has been awarded to the Brode Iron Works, but otherwise there has been nothing worth mentioning in this city. The Llewellyn Iron Works, Los Angeles, has new jobs amounting to over 1000 tons. Some small work is coming up, but most of it is unattractive to Eastern interests. The situation is disappointing in view of the numerous plans that have been announced since the first of the year, though a larger tonnage is expected in June, when bids are to be opened on several public buildings. Local fabricators have little work on hand and are not encouraged by the present outlook, as they are hampered by high labor costs and competition is very close for the work now in the market. Notwithstanding numerous plans for work in the north, fabricating orders in that quarter are coming out very slowly. Some small bridge work is in prospect in Oregon, and a project has been started for a large bridge at Portland. Plans are being prepared for a large hotel building at Portland, Ore., for the R. R. Thompson Estate Company. Beams and Channels, 3 to 15 in., from store, San Francisco, are quoted at 2.70c.

Pig Iron.—The stagnation in the local pig iron market still persists, owing to the immediate prospect of labor difficulties. A shipment of 1000 tons has just arrived from China on the contract for the Western Steel Corporation at Irondale, Wash. Large supplies are held in San Francisco warehouses, occasional sales being made at irregular prices, and local melters are not at present disposed to buy for future delivery. If a satisfactory adjustment can be effected in the labor situation a better trade may develop during the summer.

Cast Iron Pipe.—The movement continues active, with many new inquiries from all parts of the coast. Most individual orders booked recently call for moderate lots, but the total tonnage is steadily increasing. While the principal demand is for water pipe, several orders are also coming out for gas pipe. There is also considerable business in fire hydrants. The new salt water system in Oakland has been of great assistance to the fire department, and the system is to be extended this summer to include another section of the city. The San Francisco fire department has recommended an additional auxiliary system in the Sunset district. The town of Pleasanton, Cal., has taken bids on 1300 ft. of 8-in. pipe.

Merchant Pipe.—The volume of orders for delivery to the oil fields is well maintained and no decrease is anticipated in the immediate future. Some of the oil interests are now coming into the market for supplies to last through the winter. A large business is still expected in view of the necessity for better transportation facilities, though the present situation tends to reduce the demand for casing and well supplies. The present production has not broken the market to any extent, but the increasing surplus tends to discourage the opening of new wells. The tonnage booked by mill interests is for the most part confined to the larger sizes, as local merchants are still well supplied with small pipe. The distributive movement in the interior is fair, but the local demand is very small and jobbers are anxious to reduce their holdings. There is no disposition to cut prices, however, and values are firmly maintained. Bids will be taken June 1 for 2200 ft. of 30-in. lap weld steel kalamine pipe for the Portland, Ore., water works.

Old Material.—Cast iron scrap is not in strong demand here at present and some stock is being accumulated. Considerable steel melting scrap is coming into the market, and with low prices prevailing in the East local dealers are inclined to hold. There is some demand on the coast, shipments of 25 to 50 tons per day being sent from San Francisco to the Western Steel Corporation on an annual contract. The movement of old rails continues active, with a steady demand from coast rolling mills. Prices tend to advance, 1000 tons having been sold at $16. Prices are quoted as follows: Cast iron scrap, $17 per gross ton; steel melting scrap, $10 per gross ton; railroad wrought scrap, $14 per net ton; rerolling rails, $15 to $16 per net ton.

Representatives of the California Metal Trades Association and the Iron Trades Council met in conference on May 20 to discuss local labor conditions for the year commencing June 1. No conclusion was reached and another conference will be held this week. A strike has been in progress for some time at one of the machine shops at Stockton, Cal., and there is some talk of prospective labor trouble at Los Angeles, though the difficulty at the latter place has not yet come to a head.

The Ajax Brass & Iron Works has taken a contract for cast iron manhole frames, covers, &c., for the San Francisco auxiliary salt water system at $54 per ton.

It is reported that the Willamette Iron & Steel Works, Portland, Ore., will build one of the submarine torpedo boats for the Government.

New York

NEW YORK, June 1, 1910.

Pig Iron.—Buying of foundry iron in the week ending to-day has not been as heavy as in the preceding week, but considerable new inquiry has been coming to the furnaces, and a number of consumers have closed for deliveries in the third and fourth quarters. An agricultural works in New York State, which was reported as contracting for 5000 tons some time ago, did not close at the time, but expected to do so to-day. In New Jersey a number of lots of foundry iron have been taken, including one of 1000 tons and another of 1200 tons. The buying by one soil pipe interest, which was put at 3000 tons last week, was increased to 6000 tons. A boiler company which inquired for 1000 tons has been negotiating for several lots, each of that amount, and will buy 5000 tons of 1.80 to 2 per cent. silicon iron for a plant in Ohio. The new inquiry this week includes several lots of 500 tons and a Massachusetts machinery foundry is in the market for 6000 tons. Prices are substantially the same as those of a week ago—lower rather than higher. Virginia iron has been offered in New England as low as $14, at furnace, for No. 2 X, and iron from a New York State furnace has been sold in that section as low as $17.50, delivered. Buffalo furnaces have quoted No. 2 iron at $15.50 at furnace and somewhat less on sharply competitive business, but on deliveries of Buffalo iron by canal in this district a higher furnace price is netted. Our quotations on Northern iron at tidewater for delivery in the third quarter are as follows: No. 1, $17.25 to $17.50; No. 2 X, $16.75 to $17; No. 2 plain, $16.50 to $17. On Southern iron we quote $16.75 to $17 for No. 1 and $16 to $16.25 for No. 2.

Steel Rails.—The Seaboard Air Line has bought 12,600 tons from the Tennessee Coal, Iron & Railroad Company. Another order to be rolled at the Ensley mill is 4500 tons for the Panama Railroad Commission. The Oklahoma Railway Company has bought 1100 tons and the Evansville Railway Company 700 tons, from the Carnegie Steel Company. The Boston Elevated is in the market for 500 tons.

Ferroalloys.—Considerable business has been done in ferromanganese and an advance in price is looked for. Those who have ferromanganese to offer in this market are quoting $41, Baltimore, for early delivery, but they are making no price for the last half at present, as it is known that large steel interests have come into the market for a heavy tonnage for next year's delivery. There is so little ferrosilicon being sold that it is hard to make a market price, but is quoted at from $60 to $62, seaboard.

Finished Iron and Steel.—Most manufacturers in these lines found May a very satisfactory month. With some it did not equal April, but the last week was rather better than the rest, bringing the average up to a good point. In the structural trade the first five months of this year have been the best on record, with the exception of last year, being considerably ahead of 1906, which was the previous banner year. The least enthusiastic over present conditions are the bar iron interests. The steel bar trade shows no particular change; specifications continue heavy and deliveries slow, 15 to 18 weeks being the average promised. Twisted bars for concrete work can generally be had on shorter notice from the mills; generally capacity is reserved for this product, but the price is $2 to $3 a ton higher. Plates in this territory are moving quite steadily, but for the most part in small lots. Indications are that the price will stand at the present level for some time. Some cutting is reported, but

THE IRON AND METAL MARKETS

the market is not likely to go lower. The week was good in structural materials. The railroads have placed quite a little additional bridge material, but a large tonnage is still being withheld. The American Bridge Company has taken 3500 tons from the Great Northern, 1500 tons from the Chicago Great Western, 4000 tons from the Minneapolis, St. Paul & Sault Ste. Marie, with 400 tons additional for ore chutes; 10,000 tons from the Northern Pacific and 3500 tons from the Pennsylvania Lines West. The last named road also gave 700 tons elsewhere; the remaining work inquired for, involving 2700 tons, will not be built at present. The McClintic-Marshall Construction Company has 200 tons in small bridges for the Pennsylvania Railroad, and the Boston Bridge Company has 200 tons for the Boston & Maine. The Worden-Allen Company has taken 3300 tons for work on the Milwaukee Electric Railway. Bids have gone in on 1900 tons for the New York, Chicago & St. Louis, but no decision has been reached. Building work in New York City closed last week includes a loft building on West Nineteenth street, 900 tons, awarded Levering & Garrigues; a loft building on West Twenty-eighth street, 1400 tons, and the annex to the McGraw Building, 800 tons, awarded Milliken Bros., and a loft building on East Twenty-second street, awarded the Hinkle Iron Company. Notable contracts outside of New York include the following: The Byers Building, Pittsburgh, 1600 tons, and a building for the Upson Nut Company, Cleveland, 500 tons, to be fabricated by the Riter-Conley Mfg. Company; a building for the Firestone Tire & Rubber Company, Akron, Ohio, 200 tons, awarded the Riverside Bridge Company; a power house for the Philadelphia & Reading at Port Richmond, 250 tons, awarded the McClintic-Marshall Construction Company, and a building for the new blast furnace plant of the Rogers-Brown Iron Company at Buffalo, which has been taken by the Lackawanna Bridge Company. Quotations are unchanged: Plain structural material and plates, 1.66c.; smaller lots, 1.71c.; steel bars, 1.61c., and bar iron, 1.50c. to 1.55c., all New York.

Cast Iron Pipe.—No transactions of importance have transpired since last report. The general demand continues fairly satisfactory. Prices are maintained at $25.50 to $26 per net ton, tidewater, for carload lots of 6-in.

Old Material.—Inquiries have slightly improved, but transactions are comparatively few, while prices show no special change. Quotations per gross ton, New York and vicinity, are repeated as follows:

Rerolling rails	$12.50 to $13.00
Old girder and T rails for melting	12.00 to 12.50
Heavy melting steel scrap	12.00 to 12.50
Relaying rails	20.00 to 21.00
Standard hammered iron car axles	22.50 to 23.00
Old steel car axles	18.00 to 18.50
No. 1 railroad wrought	14.00 to 14.50
Wrought iron track scrap	12.50 to 13.00
No. 1 yard wrought, long	12.50 to 13.00
No. 1 yard wrought, short	12.00 to 12.50
Light iron	6.00 to 6.50
Cast borings	7.00 to 7.50
Wrought turnings	8.00 to 8.50
Wrought pipe	12.00 to 12.50
Old car wheels	12.50 to 13.00
No. 1 heavy cast, broken up	12.50 to 13.00
Stove plate	9.50 to 10.00
Locomotive grate bars	9.50 to 10.00
Malleable cast	12.00 to 12.50

Metal Market

NEW YORK, June 1, 1910.

THE WEEK'S PRICES

Cents Per Pound.

	Copper.			Lead.		Spelter.	
May.	Lake.	Electrolytic.	Tin.	New York.	St. Louis.	New York.	St. Louis.
26	13.00	12.87½	33.17½	4.37½	4.22½	5.30	5.15
27	13.00	12.87½	33.00	4.37½	4.22½	5.30	5.15
28	13.00	12.87½	....	4.37½	4.22½	5.30	5.15
31	13.00	12.75	33.05	4.37½	4.22½	5.30	5.15
June 1	13.00	12.75	32.90	4.37½	4.22½	5.30	5.15

The metal market is not very active. The pig tin market has a better tone and the monthly statistics, out to-day, are encouraging. The copper market is quiet. There is only a fair demand for lead. Spelter has strengthened in sentiment.

Copper.—Copper has, if anything, weakened slightly and consumers show little interest in the market. There are rumors of price cutting and it is certain that electrolytic copper changed hands yesterday and to-day at 12.75c. These sales were of outside lots, but there is so much copper being offered—some of it at resale—that the market quotations should be based on these sales. The trade is awaiting the forthcoming report of the Producers' Association and it is predicted that if favorable statistics develop there will be some buying. Following the last buying movement there were a number of inquiries in the market for good sized lots which have since been withdrawn, and if there are indications that stocks have been materially reduced it is expected that the consumers who then made the inquiries will place their orders. The more important sellers of copper are practically out of the market as they refuse to take anything less than 12.87½c. for electrolytic. The position of lake copper is decidedly firmer than electrolytic and sellers are holding out for 13c. The exports of copper during May, according to C. Mayer, secretary of the New York Metal Exchange, were light, amounting only to 20,232 tons. Spot copper was sold in London at the close to-day for £56 17s. 6d. and futures for £57 15s. The sales were 700 tons of spot and 300 tons of futures.

Waterbury Average.—The Waterbury average for May is 13c.

Pig Tin.—The pig tin market is stronger in tone and the monthly statistics for May show that the deliveries into consumption during the month were fairly good. They amounted to 3600 tons, and this is considered in the trade a good average consumption. The arrivals of tin during May were 2050 tons and the stocks on hand in this country are 1994 tons. These figures are, on the whole, encouraging. They show a decided reduction in stocks, and they may have a tendency to send the market upward. The American statistics were made known in London this morning and had but little effect on the market. Some interests who wanted to see the price sent downward succeeded in reducing it 5s., but this is slight, and it is thought here that London considers the American market fairly strong. Business during the week was light and consumers took but little metal. Most of the trading was done between dealers and the daily prices given above will go to show that business was done on very close margins, as the fluctuations were slight. Speculative interests in London succeeded in pounding the price down 10s. further this afternoon and the market closed with spot selling at £149 2s. 6d. and futures at £150 7s. 6d. The market was easy and the sales were light, amounting to only 80 tons of spot and 250 tons of futures. The New York market responded to the London situation and the price fell off 15 points. This afternoon pig tin was sold in New York at 32.90c., but there was not much trading.

Lead.—The United States Government is in the market for about 600 tons of lead for July, August and September delivery, and a number of sellers in New York have put in bids. This demand has tended to strengthen the market slightly, and, although prices have not changed, less concessions are being made and the tone of the market is good. Outside interests are selling lead in New York at 4.37½c. and in St. Louis at 4.22½c.

Tin Plates.—Tin plates are in better supply and the demand continues fairly good. The quotation for 100-lb. coke plates is $3.84. The foreign tin plate market is reported to be firm and active, and the price at Swansea, Wales, is unchanged at 13s. 3d.

Spelter.—All kinds of prices are being quoted on spelter but they are decidedly nominal, as there is very little buying. The consumers are under the impression that the producers of spelter have more stocks on hand than they care to have known. They call attention to the fact that in 1909 the smelters' production was greatly in excess of consumption and in consequence they are wary about placing large orders. There is less talk of price cutting, however, and sellers declare that the market is stronger. There is very little spelter in New York, except in the jobbers' stores, as most of the large selling houses are holding the metal at St. Louis and are shipping to consumers direct from there. A heavy demand for spelter for immediate delivery in this market might tend to send the price upward. The nominal price of spelter is 5.30c., New York, and 5.15c., St. Louis.

Antimony.—Consumers are taking no interest in antimony and the market is weak. Hallett's is 12½c. and Cookson's 8.37½c.

Old Metals.—The market is steady, with dealers' selling prices unchanged, as follows:

	Cents.
Copper, heavy cut and crucible	12.25 to 12.50
Copper, heavy and wire	12.00 to 12.25
Copper, light and bottoms	11.00 to 11.25
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.50 to 11.75
Clean brass turnings	7.75 to 8.25
Composition turnings	9.75 to 10.00
Lead, heavy	4.05 to 4.20
Lead, tea	3.80 to 3.95
Zinc scrap	4.25 to 4.50

Iron and Industrial Stocks

NEW YORK, June 1, 1910.

The stock exchanges of the country were closed on Saturday and Monday, thus greatly diminishing the volume of transactions. Prices showed but slight fluctuations until Tuesday afternoon, when the announcement that the Government would enjoin the Western railroads from advancing freight rates caused precipitate selling and values fell sharply. The range of prices on active iron and industrial stocks

from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com.....	9½	Pressed St., pref...	98 - 99
Allis-Chalm., pref..	32½- 33	Railway Spr., com.	39½- 40
Beth. Steel, com..	27⅞- 28	Republic, com.....	33 - 33¾
Can, com.....	9¼- 9⅞	Republic, pref.....	97½- 97⅞
Can, pref.....	71 - 72⅛	Sloss, com.....	71½- 73¼
Car & Fdry, com..	59½- 62¼	U. S. Steel, com...	79½- 83½
Car & Fdry, pref..115½-116		U. S. Steel, pref...117 -118⅝	
Steel Foundries...	53½- 55	Westinghouse Elec.	62½- 64
Colorado Fuel.....	36¼- 37½	Am. Ship, com....	82½- 82¾
General Electric...147 -149¼		Chi. Pneu. Tool.....	42
Gr. N. ore cert....	62 - 62½	Cambria Steel.....	46⅞- 47½
Int. Harv., com...	97 -101½	Lake Sup. Corp...	22 - 23½
Int. Harv., pref.....123		Pa. Steel, pref.....106	
Int. Pump, com....	46¾- 47½	Warwick	10
Int. Pump, pref...	85 - 85½	Crucible St., com..	13 - 13⅛
Locomotive, com...	46 - 48⅛	Crucible St., pref..	84½- 85½
Pressed St., com...	38⅜- 39	Harb.-W. Ref., pref.....	94

American Iron, Steel and Heavy Hardware Association Organized

At the Grand Pacific Hotel, Chicago, on May 24 and 25, was held the organization meeting of the American Iron, Steel and Heavy Hardware Association. This is a trade association of jobbers and dealers in iron and steel, heavy hardware, blacksmiths' supplies and carriage materials. The movement to organize such an association was begun in January of this year, and the meeting held on May 24 and 25 was in effect the first annual meeting of the association.

The membership list contains at present 132 names and covers the majority of the most important and influential jobbers in the United States, from Maine to California.

The meeting was well attended, some 50 of the largest jobbers in the country being present, and the representation, from a geographical standpoint, was well distributed. The addresses made were all *ex tempore*, no notice having been given in advance of intended allotments of subjects, but they proved no less interesting on that account.

Charles C. Lewis of the Charles C. Lewis Company, Springfield, Mass., who had been chairman of the Organization Committee, was elected temporary chairman of the meeting, and A. P. Plumb, New York City, secretary pro tem. The principal object of the meeting was to complete the organization of the association by the adoption of a constitution and by-laws, the election of officers and the appointment of the several committees.

Election of Officers

After the adoption of the constitution and by-laws the following officers were unanimously elected:

PRESIDENT, E. D. Kimball, E. D. Kimball & Co., Chicago, Ill.

FIRST VICE-PRESIDENT, E. P. Sanderson, E. P. Sanderson & Co., Boston, Mass.

SECOND VICE-PRESIDENT, Charles E. Faeth, Faeth Iron Company, Kansas City, Mo.

EXECUTIVE COMMITTEE, to serve for one year: E. F. Yarnelle, Mosman, Yarnelle & Co., Fort Wayne, Ind.; Irving Shadbolt, Shadbolt & Boyd Iron Company, Milwaukee, Wis. To serve for two years: E. W. A. Waterhouse, Waterhouse & Lester Company, San Francisco, Cal.; C. M. Roehm, Roehm & Davison, Detroit, Mich. To serve for three years: Charles C. Lewis, Charles C. Lewis Company, Springfield, Mass.; J. A. Gregg, Nicols, Dean & Gregg, St. Paul, Minn.

Exclusively Iron and Steel Merchants Eligible for Membership

A discussion was then had as to the desirability of soliciting the membership in the association of exclusively iron and steel merchants. The opening remarks of Chas. C. Lewis on this question were followed by a general discussion. It was argued that the jobbing of iron and steel, particularly in the West, with a few very notable exceptions, was largely in the hands of the heavy hardware jobbers. It was believed, therefore, that the situation in this line would be much strengthened by the affiliation of the exclusively iron and steel merchants; and, on the other hand, while local organizations existed among iron and steel jobbers, there was no national association to look after their interests, so that the benefits to be derived from such an affiliation on their part with the heavy hardware jobbers would undoubtedly prove mutually advantageous. It was therefore voted that the exclusively iron and steel merchants shall be solicited to become members of the association.

A. P. Plumb Appointed Secretary

Chairman E. P. Sanderson of the Executive Committee announced that it had appointed A. P. Plumb, New York City, a gentleman who has had some years' experience as acting secretary for manufacturers' associations, as secretary-treasurer for the ensuing year. Mr. Plumb thanked the committee and the association for the honor conferred upon him, and hoped he might prove of good service. He spoke regarding his experience of the considerable advantages obtained by associations of jobbers and dealers in hardware and paper lines, in dealing with manufacturers, and of the undoubted benefits which would ultimately be obtained through this association in bringing the distributers as a whole in closer touch with the manufacturers.

Next Meeting at Detroit

C. M. Roehm, Detroit, invited the association to hold its next annual meeting, which will fall in the month of May, 1911, in the city of Detroit. It was voted that the next annual meeting of the association shall be held in Detroit, Mich., during the third or last week in May, 1911.

Customs Decisions

Metallic Chromium, Tungsten, &c.

The Board of United States General Appraisers has sustained protests filed by the Goldschmidt Thermit Company, Moses Norris and others regarding the classification under the tariff of metallic chromium, manganese, tungsten, &c. General Appraiser Fischer, who writes the decision, says that these substances differ from the ferroalloys passed upon in an earlier decision of the board in that they have a much smaller percentage of iron in their composition, although in other respects they are identical in character and are used similarly in the manufacture of "special steel" or "alloy steels." The metals in question are combinations of chromium and the other substances mentioned above. The decision says in part: "We hold the merchandise specified in schedule A dutiable properly as claimed at the rate of $4 per ton under paragraph 122 of the tariff act of 1897, by similitude to ferromanganese."

Bort

In sustaining a contention raised by the General Electric Company, the board holds that, under the provisions of the tariff of 1909, socalled bort, a species of commercial diamond, is entitled to free entry. General Appraiser Sharretts, who writes the decision for the board, refers to the fact that a similar issue arose under the Dingley act. He points out that when the earlier decision regarding diamonds for industrial purposes was handed down by the board the courts upheld the decision for free entry. The board is convinced that the diamonds in question are not intended by Congress to be dutiable at 10 per cent., as alleged by the Government. The decision says that if Congress had intended that diamonds for industrial purposes were to be regarded in the same category with stones for jewelry and decorative purposes, they would have been provided for specifically in the new law with a corresponding duty. As the new law stands, the board believes that diamonds intended for tools and similar uses are free of duty. The protest is sustained accordingly.

The Machinery Markets

Business is better than normal in many parts of the country. In the East the trade is still bidding on the large list recently sent out by the Delaware, Lackawanna & Western Railroad Company, and in Chicago a list of about 60 tools has been issued by the Chicago & Northwestern Railroad. The railroads there are not doing much actual buying, but specifications for good sized lists of requirements are being prepared. There is an increased export business in most of the machinery centers and in Milwaukee, especially, sales for export are increasing rapidly. The automobile business still predominates in Detroit and there is an increased demand for woodworking machinery. In the Northwest business is reasonably good and in the Central West there is a noticeable improvement. Business there is on a firmer basis; there is a good demand for general machinery and gasoline engine manufacturers are heavy buyers. The market in Pittsburgh is strengthening perceptibly and delivery terms are being extended. There is a noticeably good demand in that territory for coal and ore handling machinery, and inquiries indicate that June will be an especially good month. In Cleveland there are indications that two large railroad lists will be out soon, and the prospects for good business from the automobile trade are excellent. In Cincinnati makers of some classes of machine tools cannot book for delivery earlier than August, and the general run of business is reported as being good. In the South the demand from the railroads is quiet, and there is a lull in the demand from the general trade. That territory is proving an excellent market, however, for electric machinery of all kinds.

New York

NEW YORK, June 1, 1910.

There is a good volume of inquiries for machinery in and around New York, but orders have fallen off slightly, although this may be attributed to the fact that the business week was badly broken up because of Decoration Day coming so soon after the usual half holiday. The trade is still bidding on the large list of requirements sent out by the Delaware, Lackawanna & Western Railroad. This list is one of the most comprehensive machine tool lists issued this year, as it covers about every line of machine tool equipment and it includes some especially heavy machines. It is estimated that the list will call for an expenditure aggregating $100,000, and those who have received inquiries have been asked to get their bids in within a short time. This is taken as an indication that the business will be closed out in the near future. A number of New York machinery houses in reviewing their books for May have discovered that it was one of the two best months of the year. March was a big month with many machinery men and there was somewhat of a lull in April. A number of houses reported that their May business equaled that of March. Agents for foreign houses who sell American machine tools abroad have been particularly busy of late getting inquiries and it appears that recent advances made in prices have influenced them in this respect. Some of these houses make a practice of carrying considerable machine tool equipment in stock and it is declared that of late they have been buying machinery only as they needed it. At the recent convention of the National Machine Tool Builders' Association, and at other conventions of machinery manufacturers, the optimistic feeling which developed has been reflected in the way of tightening of delivery terms and withdrawals of concessions. The action of foreign buyers coming into the market at this time is taken as an indication that some of them were very short of stock. Just now the export business in this territory is better than it has been at any time this year.

The fact that there is an excellent demand for second-hand machinery is illustrated by the recent sale of the Empire State Engineering Company, Rome, N. Y., which was conducted by J. E. Conant & Co., auctioneers of Lowell, Mass. Machinery manufacturing equipment was sold in 506 lots to purchasers from Buffalo, Syracuse, Watertown, Rochester, N. Y.; Adams, Mass.; Ashland, Ky.; Newark, N. J.; Chicago, New York, and other cities. The bidding for the better and larger machines was active and persistent and the equipment netted $28,450. The manufacturing lot was purchased by J. B. Wise, Watertown, N. Y.

Westinghouse, Church, Kerr & Co., 10 Bridge street, New York, have been awarded a general contract for building and equipping new shops the Kansas City, Mexico & Orient Railroad Company is to have erected at Wichita, Kan. The contract calls for a general car repair plant, and it is understood considerable machinery equipment will be purchased by the engineering company.

The Pennsylvania Railroad has awarded a general contract for the construction of a woodworking plant on the Hackensack Meadows. The building will be of brick, steel and concrete construction and will be one story and 78 x 240 ft. Planing and woodworking equipment will be installed.

A flour mill to produce about 200 barrels a day will be erected at Batavia, N. Y., by Roberts Brothers of that place. The company plans to install steam power and the machinery equipment has not as yet been purchased.

It is reported from Boise, Idaho, that interests identified with the Atlas Portland Cement Company, 30 Broad street, New York City, and other large Eastern concerns in the same line of business, are planning the erection of large, electrically operated cement works at a point near the junction of the Big and Little Salmon rivers in Idaho. A hydraulic power plant will be constructed to furnish alternating current for driving motors in the quarry, crusher house and mills. Authentication of the report is not obtainable here, but it emanates from what appear to be reliable sources.

The plant of the National Core Oil Company, Corning, N. Y., recently mentioned, will be 40 x 80 ft., two stories and basement. The equipment to be installed will consist of storage tanks and pumps.

The Niagara Machine & Tool Works, Buffalo, N. Y., Geo. A. Lautz, president, is taking bids for the initial buildings of its new plant, at Northland avenue and New York Central Belt Line, one 200 x 200 ft., brick and steel, and one 50 x 80 ft., four stories, of reinforced concrete, to be used for machine shop and office purposes.

Plans for the rebuilding of the plant of the Hooker Electro-Chemical Company, Niagara Falls, N. Y., which was destroyed by fire May 27, are being prepared and construction work will be commenced at the earliest possible moment. Six buildings were burned, two cellhouses, two bleach houses, repair shop and brine tank house, the loss on buildings, machinery and equipment being about $300,000. The plant, which covered 7 acres, was not put completely out of business, enough buildings remaining to permit continuance of manufacturing on a limited scale.

The Cutler Desk Company, Buffalo, N. Y., has purchased the plant of the Niagara Bedstead Company, adjoining its own plant at Austin and Churchill streets and the New York Central Railroad, and will install new machinery, increasing the capacity of the Cutler Company's plant about one-third.

The Dyett Tool & Engineering Company has been incorporated at Ilion, N. Y., to manufacture tools, machinery, engines, &c. The capital stock is $100,000 and the incorporators are F. J. Dyett, B. B. Ross and A. L. Johnson.

The Winans Machine Company has been incorporated at Binghamton, N. Y., by Thomas J. and Daniel M. Winans and Charles J. Knapp, to engage in the manufacture of machinery and tools. The capital stock is $75,000.

The Deyo-Macey Engine Company, Binghamton, N. Y., has been incorporated, with a capital stock of $100,000, to manufacture gas and gasoline engines, motors, &c. R. Herbert Deyo, Frank T. Macey and Israel T. Deyo of Binghamton are the incorporators.

Sealed proposals will be received by the United States Engineers' office, Federal Building, Buffalo, N. Y., until June 27, 11 a.m., for the construction and erection of steel lock gates, valves and operating machinery for the U. S. Ship Canal lock in Black Rock Harbor, Buffalo. Specifications and information furnished on application. W. L. Fisk, Colonel of Engineers, 540 Federal Building, Buffalo.

The New York Central Railroad Company will erect at

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New Durham, N. Y., a 32 stall roundhouse, a machine shop, a boiler house and annex and an office building.

Bids received for the power plant for the Erie County Penitentiary, Buffalo, have been rejected by the Board of Supervisors and new bids will be called for on modified plans which have been ordered prepared. Geo. C. Diehl is county engineer, 575 Ellicott Square Building, Buffalo.

Engineer Martin C. Schwab, 161 State street, Chicago, is taking bids for the manufacturing plant which the Simonds Mfg. Company is to built at Lockport, N. Y. Six buildings will be erected, steel framework, brick and reinforced concrete construction.

A large dredge for use in placer mining will soon be shipped to Burmah, India, from the works of the Bucyrus Company, South Milwaukee, Wis. It is being built with a steel hull and has been designed for service of the most severe character, so as to lessen liability of repairs. The purchaser is an English company.

The installation of new pumping machinery, doubling the present capacity of the municipal plant, is under consideration at Canandaigua, N. Y.

Manning, Fish & Co., 103 Park avenue, New York, have been awarded a general contract for a six-story loft building to be erected at 142 East Thirty-second street.

The Automatic Register Company, Dover, Del., has purchased all patents, pending contracts, stock and other assets of the American Fare Register Company of St. Louis, Mo., and is considering the erection of a plant at a location not yet decided upon to cost about $500,000.

Bids will be received June 9 at the office of the President of the Borough of Manhattan, City Hall, New York, for furnishing engine driven fans for the boiler plants of seven public baths, and turbine driven fans for the boiler plants at Cherry and Oliver streets and 83-85 Carmine street. The security required is $3000, and 30 days will be allowed in which to complete the work.

Catalogues Wanted

The Wilkinson Machine Company, Savannah, Ga., is arranging a library of catalogues and is asking for printed matter of machinery and mill supply manufacturers.

Business Changes

The Weston Engineering Company has moved its offices from 39 Wall street to 132 Nassau street, New York.

Chicago

CHICAGO, ILL., May 31, 1910.

Chicago machinery houses report considerable improvement in trade conditions during the past week. There are more inquiries and more business is being done, although the volume of trade is not up to the standard that dealers would like to see. However, a number of good orders have been booked recently and the run of small orders for single machines is very satisfactory. The railroads are doing very little in the way of actual buying and the impression is given ground that they will not do much until July. The leading Western roads had a very hard winter, and although their gross receipts have shown up well their operating expenses have been unusually high on account of severe weather during the winter, the expense of keeping the tracks clear and the bad condition of their equipment. They are doing better now, but their officials will naturally be anxious to restrict expenditures until June 30, the end of their fiscal year. Good inquiries are coming out, however, from the railroads.

The Chicago & Northwestern is getting bids on a new list of tools given below, on which deliveries are expected in October. This apparently is not connected with the list sent out by that road last winter and the two lists together will make a very fair showing if all the equipment inquired for is purchased by this company. Other Western roads are known to be collecting data for the preparation of lists, and this business, with several old lists that are pending in the market, may all come in a bunch when the roads get ready to purchase. The Pennsylvania inquiry for shop equipment for its Western lines is a very satisfactory addition to the amount of railroad business now pending. This machine tool list covers tools required for its lines at Erie, Pa., Conway, Pa., Fort Wayne, Ind., Alleghany, Pa., and Chicago. Apparently the company is not desirous of promoting competition on the business as only a few machinery houses have had an opportunity to submit bids.

Chicago machinery men say that the hesitating tendency of customers in placing orders has made it difficult for them to get satisfactory deliveries on many tools. This is especially true of lines like milling machines on which the factories are sold ahead. Often the factory has a few stock machines available for early delivery on which the dealer can quote a price, but nothing is heard from the customer for two or three weeks or possibly a longer time. When he finally decides to buy, the tools which the dealer had in mind are gone and the factory schedule may be filled for several months. Now that the factories are beginning to fill up with work it is becoming more and more important for the buyer to close while he has an opportunity to get early deliveries. If the railroads should suddenly take a notion to buy the equipment which they need the manufacturers of lathes and other lines may be sold as far ahead as milling machines and boring mills are at the present time.

Chicago & Northwestern Railroad List

One 90-in. motor-driven wheel press, capacity 600 tons, complete with motor gauges, &c.

One 90-in. extra heavy motor-driven quartering machine equipped with steady rest for boring bar iron for right lead engines, complete with motor.

One 32-in. swing bed triple geared lathe, motor-driven, gear drive.

Two 28-in. swing, 10 ft. 6 in. bed, quick change gear lathes, motor driven, gear drive, with 24-in. four-jaw independent and universal chuck.

Four 24-in. stroke back geared crank shapers, with vise, motor driven.

Two 48 x 48 in. bed motor-driven planers, two plain heads.

Two 18-in. crank slotters, motor driven.

One 51-in. boring mill, 36 in. under tool holders, double head, bar travel 24 in., 51 in. table, motor driven.

Seven 40-in. drill presses with sliding head, back geared, motor driven.

One double head rod boring machine, distance between spindles, least 36 in., greatest 10 ft., travel of spindle, 14 in., table 20 in. wide by 10 ft. 10 in. long, motor driven.

One 37-in. boring mill, single head with four side turrets, motor driven.

Four double emery wheel stands, to take 18 x 1¾ x 1¼ in. hole, safety emery wheel, motor driven.

Two No. 2 hollow hexagon turret lathes with standard equipment, with the exception of automatic opening die, but furnish in place one geometric die head 2 in. size, style D, motor driven.

Three 30-in. lathes, 7-ft. centers, with taper attachment, motor driven, with one 26-in. four-jaw independent and universal chuck.

One 38-in. swing, 15-ft. bed, triple geared motor-driven lathe, gear drive, 7½ hp. motor and four chuck jaws for face plate.

Two No. 4 universal milling machines, with centers and dividing head, also three-jaw universal chuck vise, motor driven, gear drive.

One plate grinder, 26 in. swing, 96 in. between centers, diameter of emery wheel 26 in., thickness 2 in., hole 12 in., without internal grinding fixtures or chuck, motor driven.

One guide grinder, 80 in. x 10 ft. 6 in., table equipped with safety ring wheel, chuck, and to hold 24 in. ring wheels.

One 21-in. lathe without carriage but with movable turret, motor driven.

One 20-in. lathe with turret or carriage, with 12-in. three-jaw independent and universal chuck, motor driven.

Two 44 x 36 in. x 12 ft. bed spur geared planers, motor driven, double head plain.

One 90-in. universal chuck radial drill press, motor driven.

One 24 x 24 in. x 6 ft. bed worm driven planer, gib bed, motor driven, single head, designed for shoes and wedges.

One four spindle multiple drill with compound movement of table and power elevating gear, 7 ft. between housings, capacity of this press to drill 4½ in. holes four at a time, motor driven.

One double head bolt cutter, maximum 2½ in., motor driven.

One 1½ in. double head bolt cutter, with patented all steel die head, motor driven.

Three No. 2 diamond wet tool grinders, motor driven.

One Q. & C. power hack saw, to take 14-in. blade, motor driven.

Two 14-in. swing, 6-ft. bed engine lathes, quick change gears, with one 12-in. four-jaw independent universal chuck, motor driven.

One 16-in. lever feed drill press with drill chuck to hold drills from 1-16 in. to ½ in., motor driven.

One 8-in. maximum drill grinder with pointing attachment for 8-in. wheels, motor driven.

One No. 2 floor grinder with two 14-in. wheels, 1 in. thick, 1 in. hole, four spindle, motor driven.

One No. 3 universal grinding machine.

One 12-in. swing, 5-ft. bed speed lathe, equipped with 4-in. three-jaw universal chuck, motor driven.

One splitting shear, splitting capacity up to ½ in., motor driven.

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One adjustable wall radial drill, maximum distance from wall to wall to center of spindle, 6 ft. 3 in.

McDowell, Stocker & Co., Chicago, have the exclusive sale of a large list of second-hand tools from the Holsman Automobile Company, 3600 South Morgan street, Chicago. The Holsman Company has gone into liquidation and among the tools which are now on the market are 20 engine lathes, 11 drill presses and a list of miscellaneous tools. Part of the equipment of this factory has been taken over by a new company which has been organized to furnish repairs for Holsman vehicles which are now in use throughout the country. This concern, the Holsman Equipment Company, has taken over about one-third of the tools from the old plant.

The Chillicothe Foundry & Machine Company, Chillicothe, Mo., recently incorporated with a capital stock of $15,000, has purchased the foundry and machine shop formerly conducted by Frank Way and will do a general foundry and machine shop business.

Deere & Co., Moline, Ill., who have arranged to erect several large concrete buildings as addition to their plow factory, will use rock secured from quarries on the company's own property. The crushing is to be done in a plant especially ordered for the purpose, which consists of a No. 6 Gates gyratory breaker, one set of 15 x 40 in. Anaconda crushing rolls, elevator and revolving screen, the entire equipment being driven by Allis-Chalmers induction motors of 30 and 100 hp.

The power plant of the Decatur Railway & Light Company, Decatur, Ill., which is equipped with General Electric generators of 2000 kw., driven by Corliss engines, will be enlarged by the addition of another 1000 kw. set. This company forms a part of the Illinois Traction system.

The Chicago Union Foundry Company has taken contract for the iron work of a new three-story plant to be built by the Commercial Furniture Company, Chicago. Most of the equipment needed by the latter has been provided for.

By order of the court, the receiver, Thomas Duncan, will offer for sale June 8 the Sterling Electric Works of Lafayette, Ind., one of the best known manufacturers of telephone equipment in the country. The assignment and appointment of receiver followed the loss of an important suit, involving the right to manufacture certain switchboard and other telephone equipment, the main product of the factory, the case being decided in favor of the Western Electric Company of Chicago. The property is not to be sold at less than its appraised value, $185,000. The company formerly employed 100 to 400 men.

The Tiebert Gas Engine Company has been incorporated at Butler, Ind., with $20,000 capital stock, to manufacture gas engines. The directors are H. M. Showalter, D. A. Baker, J. W. Showalter, Frank Creager, E. B. Dunton, Walter Snider and J. G. Wagner.

The Bell Smokeless Powder Company has been organized at St. Paul, Ind., to manufacture a smokeless powder patented by Dr. J. W. Bell of that city. Dr. Bell is president of the company.

The United Gas & Improvement Company, Jeffersonville, Ind., has purchased land as a site for a new receiver to cost $27,000.

The Fence Brace Company has been organized at Bluffton, Ind., and incorporated with $10,000 capital stock, to manufacture fence braces. The directors are J. A. Ullman, A. P. Ullman and M. M. Ullman.

The Alexandria Mfg. Company has been organized at Alexandria, Ind., with $30,000 capital stock, to manufacture novelties, implements, tools, &c. The directors are H. V. Otto, A. E. Otto, F. C. Headington, Charles Zell and M. R. Thompson.

The McBeth-Evans Glass Company, Elwood, Ind., will add to its plant a brick building 150 x 250 ft., in which will be made the pots for the Elwood, Marion and Toledo, Ohio, plants.

The citizens of Elkhart, Ind., showed their appreciation of a man who has been at the head of one of the leading industries of that city for nearly half a century by greeting C. G. Conn at the railroad station on his return from California May 26 to the number of 12,000, and escorting him to a hotel where an informal reception, attended by about 25,000 people, was held. Mr. Conn's band instrument factory was destroyed by fire May 22. He had telegraphed from Catalina Island, when he learned of the fire, to have the manager make preparations at once to rebuild. The property loss was about $1,000,000.

The Dodge Mfg. Company, Mishiwaka, Ind., has issued $1,500,000 of preferred stock, to provide for factory enlargements. The company makes power transmission appliances. There is at present 19 acres of floor space in its factory buildings and it employs 1200 men. Melville W. Mix is president.

Work has commenced on the new shop of the Stephens-Adamson Mfg. Company, Aurora, Ill. The new building will be 80 x 300 ft., of steel construction and will be used as a steel fabricating shop. It will be equipped with a 10-ton, three motor electric crane with 80 ft. span, which has already been contracted for. The company intends to move its present steel shop into the new building and convert the old building into an additional machine shop.

A large list of rebuilt machine tools, embracing turret lathes, screw machines, milling machines, lathes, drills, &c., has been issued by the H. A. Stocker Machinery Company, whose warehouse and offices are located at 566-572 West Randolph street, Chicago.

Philadelphia

PHILADELPHIA, PA., May 31, 1910.

Manufacturers, particularly those building the heavier lines of machine tools and special equipment, are beginning to feel the lull in buying which has heretofore been reported to a more considerable extent by machine tool merchants. The reason for the quieter conditions is attributed largely to the lack of any pronounced railroad buying; proposed programmes for this year, although made up, have in a number of instances been held back pending, it is stated, legislative matters, and only such tools as may be absolutely needed are being purchased. The larger industrial plants also show some hesitancy in placing orders, owing to the sluggishness of both the crude and finished material markets. On the whole, however, the trade anticipates a better condition of business during the last half of the year, before which time it is hoped that the influences holding back purchases will have disappeared. A somewhat better movement in export orders is reported, but those which have been coming to the trade in this territory have been largely for equipment of a special character. There has been no diminution in activity on the part of the various tool builders, order books are still very comfortably filled and there is sufficient work on hand to keep plants well engaged for quite a long period ahead.

Several of the local merchants report a shade better business during the week; others, however, have not been so well favored, so that the market still has an irregular appearance. Inquiries, while not individually large, keep the trade active, although the business closed has been principally in small tools and does not aggregate a very heavy total.

Quite a fair business continues to be done in second-hand machine tools, sales covering a varied line of equipment. The demand for power equipment continues fairly active, although the bulk of the business appears to be for that of the small and medium horsepowers. Machine tool builders report unchanged conditions in connection with casting supplies; prompt deliveries on steel castings are extremely hard to get, although gray iron castings can be promptly obtained.

The Vandyke, Churchill Company, machine tool merchant, will remove about July 15 from its present location, 917 Arch street, to the Bourse Machinery Hall, Bourse Building.

A rearrangement in the machinery selling forces of the Fairbanks Company in this city is announced. F. W. Lorenz has retired, while E. T. Mathewson takes sole charge of the business of the machine tool department, assisted by A. C. King, who has been taking charge of the floor work of the department but who will now give some attention to outside work. F. E. Mathewson of Providence, R. I., has also become associated with the sales forces of this department.

The National Underwear Company, Spring City, Pa., has, it is stated, let a contract for a knitting mill from plans prepared by J. V. Poley, Royersford, Pa., to Jacob Mawray, contractor, of the latter place.

Wm. Wharton, Jr., & Co., Inc., have acquired additional property on South Twenty-fourth street and Ellsworth street, adjoining its present plant. The recent purchases measure 60 x 64 ft. and 72 x 80 ft., respectively, and have, it is stated, been bought with the view of extending the plant.

The Tabor Mfg. Company reports a very satisfactory volume of business in foundry molding machines and is operating its plant at full capacity. This company will make an extensive display of molding machines at the coming exhibit of the Foundry and Manufacturers' Supply Association in connection with the annual convention of the American Foundrymen's Association at Detroit June 6-10. A floor space of 1500 sq. ft. in section B in the Horticultural Building will be occupied, and exhibits of its standard power squeezing machines, roll over machines, operated by hand and power; shockless machines, combined jarring and roll over machines, and combined jarring, squeezing, roll over machines will be made. The machines will be set on an exhibition floor so that everything will be in plain view, with raised platforms built to show proper floor level.

The Energy Elevator Company is operating its plant overtime in order to meet the heavy demand for its various types of elevators. A number of large electric power freight

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elevators are being installed in this city, and a third order has been received from a concern in Vineland, N. J., for an elevator of that type. Quite a number of sales for elevators of the hand power type have been received from the West, particularly from the Pacific Coast. Apartment house food lifts are also being installed in considerable number, while the company also has an order for a special curtain lift to be installed in a new theater at Fifty-seventh and Ludlow streets, which apparatus has been adopted by the local authorities as the standard for that character of work.

The Newton Machine Tool Works, Inc., reports a somewhat better export business. Orders have been booked for cold saw cutting-off machines for Australia and China, and machines for electrical machinery manufacturers from Continental Europe. Ten large cold saws were also recently taken for shipment to Japan. There has been a shade less domestic business, although a number of orders for cold saw cutting-off machines from steel casting plants, bar and combination type cold saws and slab milling machines have been booked. The company is operating its plant at full capacity and an optimistic view of future business is expressed.

Weaver & Wittle, Lebanon, Pa., have recently taken an order for a lot of 100 1-hp. gasoline engines for shipment to a Philadelphia concern, also a large number of the same capacity as well as those of 2½-hp. for local and other customers. The engines of the smaller capacity are used for driving small machines as well as for general domestic power purposes, such as vacuum cleaners, cream separators, &c., the larger type being principally used to furnish power for pumping purposes.

The Philadelphia Rapid Transit Company is erecting at Germantown and Erie avenues a small power house for the extension of its service in that district. No extensive equipment, except a few motors, will be required, as the plant will be used largely for substation purposes.

The Beach Haven Water Company, Beach Haven, N. J., will build an addition to its power house from plans by Savery, Scheetz & Savery, architects. Direct connected gasoline pumps are to be installed and a new stand pipe erected.

Cincinnati

CINCINNATI, OHIO, May 31, 1910.

Business for the closing days of May has been, for the most part, of an encouraging nature to tool manufacturers. Orders for milling machines, lathes, upright drills, grinders and the tools that enter largely into automobile building are still being booked for deliveries rarely earlier than August and some September and October. No large lists of any size appeared during the week, but some purchases for shop installation were of sufficient size to merit notice. The dealers report some very promising inquiries. Dealers in second-hand machinery are quite pleased with conditions, those making a specialty of power plant equipment reporting a number of good sales during the week. Dealers in second-hand tools state the demand is good for all types, but sales have been largely of single machines.

Jobbing foundries, as a rule, are not so busy as they were earlier in the year and a number are on the three-heat per week schedule.

About 30 members of the Cincinnati Foundrymen's Association attended a meeting on Saturday evening, May 28, at the Grand Hotel, to meet Frank T. F. Stephenson, chairman of the Central Committee, Detroit, which will entertain the allied foundry delegates June 6-10. Mr. Stephenson gave a practical talk on what the associations hope to accomplish at the convention, showed a number of interesting views of the entertaining city and urged a strong delegation from Cincinnati. President H. M. Ramp of the Cincinnati Association, who is the superintendent of the Modern Foundry Company, and Secretary Fred J. Brunner, identified with the S. Obermayer Company, are both working hard to secure a large attendance from Cincinnati. The Modern Foundry Company, located at Oakley, will send 2 tons of cores to the Detroit convention as a part of the exhibit of the Arcade Molding Machine Company. The Modern Foundry is one of the busiest places of the country in its line. The company is melting now from 20 to 30 tons per day in daily heats, with a present capacity of about 37. When the Cincinnati Milling Machine Company gets into its own plant in the same district the capacity of the foundry will be increased considerably. About 180 men are now on the payroll.

The Norton Machinery Company, Cincinnati, making a specialty of second-hand power plants and equipment, has just sold to a concern in central Ohio a 750-hp. cross compound engine equipment; to a power station company in Lima, Ohio, a 1200-kw. direct connected generating set, and has just finished shipment on a 500-hp. plant complete for a new concrete material establishment in Columbus, Ohio. President Norton reports business excellent in power equipment.

Estimates are now being received on the new plant of the D. T. Williams Valve Company to be erected on Hunt street, Cincinnati, and the architects, Samuel Hannaford & Sons, are expected to award contracts early in June.

The Ohio Engineering & Contracting Company is a new incorporation in Pomeroy, Ohio, with a capital stock of $5000. The incorporators are W. F. McCormick, E. G. Campbell, R. C. Cooper, H. E. Campbell and V. C. McCormick.

The O. O. Poorman Company has been incorporated at New Bremen, Ohio, to manufacture sheet metal machinery, by O. O. Poorman, Edward M. Ziegenfelder, Lenora O. Ziegenfelder, O. M. Gotschall and E. H. Turner. The capital stock is $30,000.

The Superior Iron & Mfg. Company has been incorporated at Toledo, Ohio, with $50,000 capital stock. Ernest C. Hagener is one of the chief incorporators.

The Indianapolis Switch & Frog Company, with works and main office at Springfield, Ohio, has established a Chicago office in the McCormick Building, with J. C. Jameson in charge of sales, for the company's entire line, including solid and insert manganese frogs and crossings, as well as regular construction for steam and electric railway work, industrial and mining track, &c.

The Columbus Pneumatic Tool Company, Columbus, Ohio, is completing a handsome factory building on South Parsons avenue in that city.

A number of Dayton, Ohio, capitalists interested in the Seamless Pressed Steel Mfg. Company of Red Key, Ind., met at the Phillips House in Dayton recently to hear reports on that company, which has made a great success of its work. The company does a steel welding business on a large scale by a new French process, which patents it controls.

The contracts for the new Cincinnati, Hamilton & Dayton Railroad shops and roundhouse at Toledo, Ohio, which are being let, call for an expenditure of $100,000. This is in addition to the cost of construction of docks and yards, appropriations for which were made some time ago.

It is reported from New Bremen, Ohio, that Jacob Boesel has purchased the real and personal property known under the name of the New Bremen Foundry, and will arrange to start the business at once.

R. P. Shattuck of Brazil, Ind., has bought the machine shop on Elm street, Clinton, Ind., formerly owned by T. L. Foust. Mr. Shattuck was formerly foreman of the wire fence factory in Brazil.

The plant of the Parkersburg Machine Company, located at St. Marys, W. Va., has been removed to Parkersburg, taking the old plant of the United States Engine Works there.

The Lafayette Engineering Company, Lafayette, Ind., has a contract for building additions and extensions to the Monon Railroad shops in that city, which will cost about $25,000. The machine shop department will be considerably enlarged.

Architects have completed the plans for the enlargement and improvement of the plant of the Edna Smelting & Refining Company, Cincinnati, and bids will be awarded some time during June. President Isaac Joseph will spend about $100,000 on the addition which is to take the place of the frame structure now occupied by the company. The new plant will have a frontage of 75 ft. on Reading road and a depth of 250 ft. The first annual outing of the 200 employees will be given in July at Highland Grove, on the Cincinnati, Lebanon & Northern Railroad. All expenses will be paid by the company.

Cleveland

CLEVELAND, OHIO, May 31, 1910.

The aggregate amount of business placed with local machinery houses in May was about the same as in April. During the week the market has been somewhat quiet and without special features, although some of the dealers report a slight improvement in inquiries. Buyers lately have been rather slow in placing orders after inquiries were out, and some of the sales during the week had been pending for some time. The demand from the automobile trade is still light, but a good volume of business is expected from this source shortly when orders are placed for next season's requirements. While little business is coming from the railroads in this territory, two railroad lists are expected to be out shortly. In standard tools the demand is most active for lathes and milling machines. Orders for planers show some improvement and there is a fair demand for boring mills. A decided improvement is noticed in the demand for bolt and

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nut machinery, which is now quite active. Reports from the bolt makers indicate a better demand for their products. There is a fair demand for second-hand tools, but the supply that is being offered to dealers is still quite limited.

Makers of industrial cars and locomotives report a good volume of orders and inquiries. While this business is fairly well scattered, a large share of it is coming from steel plants. In electrical equipment orders for small and medium sized motors are not so numerous as earlier in the season, but local manufacturers are well filled with work. The general situation among manufacturers in metal working lines in this city and northern Ohio continues quite satisfactory and plants, as a rule, have enough business to keep them running at full capacity.

A large amount of machinery will be required in a short time to complete the equipment of the new locomotive shops of the Wheeling & Lake Erie Railroad, at Brewster, Ohio. Large shops have been under construction at that point during the past year, machinery for which was purchased about a year ago. The purchases at that time did not include all the equipment needed for the locomotive shops. A list is now being prepared, which will be given out as soon as the receiver, B. A. Worthington, of Cleveland, receives authority from the court to make the expenditure. An expenditure of about $150,000 is planned. Of this, $93,000 will be for machinery for the locomotive shops and the remainder for cranes, an air compressor and other outside machinery equipment.

A high pressure pumping station will be built by the city of Cleveland in the downtown business section during the present year. Preliminary steps toward the construction of the plant have been taken during the past few days and proposals will be asked for within the next few weeks, as soon as plans are agreed upon and prepared. An installation of four or five units, with a total capacity of 10,000 gal. per minute, is planned, room to be provided for additional installations later. Gas engines will probably be used for power. The plant will cost about $175,000.

Proposals for the power plant to be erected in connection with the new Cuyahoga County court house in Cleveland will be received by the County Building Commission, 425 Garfield Building, June 29. Detailed plans and specifications will be out this week. Proposals will be asked for building and stack, boilers, mechanical stokers, coal and ash handling machinery, steam engines, electric generators, steam piping and auxiliaries, switchboard, crane and trolleys, machine tools, tunnel construction, condenser equipment, &c.

The National Sanitary Mfg. Company, Salem, Ohio, maker of plumbers' enameled ware, has commenced the erection of an addition to its plant, 100 x 168 ft., one story. This will be used as a warehouse and packing department. Two additional furnaces will also be installed in the plant. When the present addition is completed the company will probably build a large addition to its foundry. This company enlarged its plant considerably about a year ago, but it still finds that its capacity is too small to supply the demand for its products.

The Atlas Car & Mfg. Company, Cleveland, reports a heavy demand for industrial car and locomotive equipment and that some departments of its plant are being run overtime. Among the larger orders recently received by this company are the following: 12 100-ton electric transfer cars, skip hoists and two locomotives for a Western smelting plant; 16 hoists, 8 cages, 12 skips and other equipment for iron ore mines in the Lake Superior district; two 150-ton 60-ft. electrically driven turntables for a manufacturing plant, and a number of ingot and billet cars for a Western steel plant.

The American Shipbuilding Company, Cleveland, will add to its Lorain, Ohio, plant by the erection of a large forge and blacksmith shop, work on which will be started soon. The company has under consideration other additions, including a machine shop and foundry, but it has not yet been decided whether these will be built during the present year.

The W. H. Mullins Company, Salem, Ohio, reports business good in all of its departments. The company is getting a large volume of orders for boats and its output of boats this year will be practically double that of last year. Orders are being received from all over the world. Among recent orders was one from Arabia for 26 large power boats for use on the Red Sea.

The Deming Company, pump manufacturer, Salem, Ohio, reports that orders continue to come in in very satisfactory volume and that it is well filled with work. This company is pushing work on its factory addition, which will be a four-story brick building, 50 x 200 ft., to be used as a warehouse and for manufacturing purposes.

The Board of Trustees of the Columbus State Hospital, Columbus, Ohio, will receive proposals June 23 for new boilers and piping. Plans and specifications are on file with the superintendent, Charles F. Gilliam, and at the office of the architect, Frank L. Packard, Columbus.

An addition will be built to the power house of the Ohio University, Athens, Ohio. The Board of Trustees will receive bids June 16 for the erection of an extension to the building, new boilers, feed pumps, vacuum pumps, piping, smokestack, &c. Plans and specifications are on file with I. M. Foster, secretary of the board, Athens, Ohio.

A subpumping station will be built in connection with the water works in Lorain, Ohio. Bids will be received by the Director of Public Safety.

It is reported from New Philadelphia, Ohio, that the Tuscarawas Electric Light & Power Company of that place, which operates a 500-kw. plant, will install a new dynamo of 200 kw. for alternating current.

The Vulcan Steam Shovel Company, Toledo, Ohio, has established new Pacific Coast headquarters in the Metropolis Trust Building, San Francisco.

Construction of a pumping station equipped with modern machinery will be begun this summer at Dunkirk, Ohio.

Bids will be received by the Board of Trustees of the Girls' Industrial Home, Delaware, Ohio, until June 27, for completing the lighting and heating system of the home. Specifications include two additional engines and generators, 4500 ft. of steam heat conduit, reinforced concrete coal storage pocket, reinforced concrete electric light standards, wiring, lamps and fixtures for 12 buildings. The total amount of the appropriation for this work is $70,000. Plans and specifications are on file in the office of the consulting engineer, Harold M. Bush, 69 North Fourth street, Columbus, Ohio.

New England

BOSTON, MASS., May 31, 1910.

Two years or more ago, when times were dull, a movement was started intended to be national in scope to cry industrial optimism. The effort, entirely artificial in character, was carried out in a large way, but failed signally because there was no business to be forced into existence. Today an unstable wave of pessimism is making progress, thus far with no very threatening results, because business exists and cannot be throttled. According to reports from various centers of the country the East is less prosperous than the West, and New England is undoubtedly considered to be as depressed as any other territory. The cotton manufacturers are curtailing production because of the high price of their raw material. The woolen business is not prosperous. The jewelry trade is inactive. Retail merchants complain that their trade is not what it should be and other instances of business depression are exploited, particularly in the daily press. But in New England practically every manufacturing concern using the metals as raw material is doing at least a normal business. Many are running with night shifts. Every one is complaining that good labor is scarce. Curtailed production is enforced in not a few by the fact that help is not available. The amount of industrial building recently completed, under way and contemplated is far above the average. The few cases of the cancellation of announced building plans are for the most part due to the high figures submitted by contractors.

The month of May has certainly totaled a larger business than was generally anticipated. With some concerns it was less than April and March, with others it was greater. In the New England territory the automobile industry is not so influential a factor as the miscellaneous trade. The business is more widely distributed. The textile machinery people—cotton, woolen and silk—are buying in considerable volume in spite of the present condition of the industries they serve. The shoe machinery manufacturers are large customers, and so are the electrical works. So it is through the long list of metal industries of the New England States. This is the practically unanimous statement of the manufacturers and dealers. The railroads are buying to a rather limited extent. The Rutland Railroad will erect immediately the new boiler shop at Rutland, Vt., already alluded to, and has purchased the heavier portion of the equipment. The Boston & Maine Railroad has yet to send out its general list for the new Somerville shops. The dealers have heard that not all new machines will be installed there, one plan being to move certain tools from existing shops. An interesting report comes from Lawrence, Mass., that this company is to spend $1,000,000 in that city, including a large roundhouse and an auxiliary machine shop, but this has not been verified.

Certainly the market for machine tools at least equals production. Probably this is too conservative an estimate, for deliveries are becoming more distant rather than improving. Most shops are running at as high a rate of production as is economical, the only deterring influence being, as stated, the inability to secure a sufficiency of skilled labor. The dealers have disposed of millions of dollars worth of stocks since January, 1909, and the builders' storerooms are

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well depleted, so that hereafter the market must be supplied from current manufacture. It is significant that electrical equipment for quick delivery is scarce, this being especially true at the present time of alternate current motors.

An enormous latent buying power exists in the country as a whole. The railroads have hardly begun the purchase of their machinery requirements. No matter what the future may bring to the automobile industry—and its continuance as a great factor in the market is assured—the next year will see it very prosperous unless all signs fail. Very generous inquiries are in the dealers' letter files.

Observers who are watching the situation in its broader aspects see no menace to industry. Realizing the political unrest, they feel it will have a tendency to hold back business, but this they consider to be a beneficial rather than a detrimental influence. The volume of trade has increased very greatly since early in 1909, and has reached a normal altitude. Were it not for some retarding element in the situation boom totals would be reached. The feeling of many men is that a protracted period of good business is far better than a rush upward, with the inevitable sudden reaction which must come with the straining of credits under a crisis. At the present time credits are far from strained. A large factor of safety exists. Crop conditions are propitious. The retail buying power of the people is increasing with continued steady employment. Altogether the outlook should be a bright one, with no factor in sight of sufficient strength to lower the market beyond the point from which it can react quickly and healthily.

C. H. Kingsbury, for the past 12 years manager of the Niles-Bement-Pond Company's Boston office, will take an extended vacation of several months, on account of ill health. Previous to his departure the managers and heads of departments of Hill, Clarke & Co., Inc., Chandler & Farquhar Company, Prentiss Tool & Supply Company and Manning, Maxwell & Moore called upon Mr. Kingsbury and extended their best wishes for a rapid return of health, and presented him with a Masonic charm, suitably engraved, as a token of friendship. Mansfield Estabrook of the New York office will have charge during Mr. Kingsbury's absence.

The Heald Machine Company, Worcester, Mass., has decided to increase its works greatly. Only tentative plans have been made as to the form the enlargement will take, but the floor space of the plant will be at least doubled, and new machinery will be installed to more than double the producing capacity. The company now employs 150 men. The new building will increase that number to 300. The demand for the company's grinders, notably the cylinder and the piston ring machines, has become so great that very greatly increased facilities are required to meet the demands for calls of the market. No idea of the nature of the machinery requirements can be obtained.

The new building which the Knox Automobile Company, Springfield, Mass., will erect this season will be 66 x 125 ft., six stories, with basement, increasing the floor space of the works by 25 per cent. The company now employs 900 men, producing at the rate of 800 cars annually, and the new facilities will increase the output to 1000. The basement of the new structure will be used for storage, the first floor for blacksmith shop, and the upper floors for storage and for such departments as upholstering and painting.

The Manville Covering Company, Providence, R. I., manufacturer of section covering and plastic cement, will immediately rebuild the plant destroyed by fire recently. The company is not yet prepared to state what will be required in the way of machinery.

The W. & B. Douglas Company, Middletown, Conn., manufacturer of pumps, is making up outfits for contractors, consisting of gasoline engines coupled to diaphragm pumps, the whole set on wheels. The outfit is used for such purposes as pumping out cellars and ditches.

The new building which the Fore River Shipbuilding Company, Quincy, Mass., is about to erect, will be devoted to office purposes. This company has purchased some additional equipment for use in the construction of the new battleships for the Argentine Republic.

The new building of the Bristol Company, Waterbury, Conn., which will be devoted to its belt hook department, will be 48 x 100 ft., three stories.

The business of the Bridgeport Safety Emery Wheel Company, Bridgeport, Conn., manufacturer of grinding machines and abrasive wheels, has passed from the hands of the receiver, who has been operating it for some two years, and will be carried on by a reorganized corporation.

The Rangely Lakes & Megantic Railroad Company has been organized at Augusta, Maine, to build a new railroad through the lumber regions of Franklin and Oxford counties, from Oquossoc in the Rangely region to the Canadian border, a distance of 30 miles. The connection of the enterprise with the New York, New Haven & Hartford interests is indicated by the presence of President Mellen of that system and President Tuttle of the Boston & Maine in the list of shareholders.

Pittsburgh

PITTSBURGH, PA., May 31, 1910.

The market for machine tools and shop equipment of almost every kind is perceptibly strengthening. Deliveries also, as recently predicted, are drawing tighter. While in most cases arrangements can be made to take care of the needs of regular customers, for some tools specified dealers find it difficult to promise anything under six to eight months, and a good many bookings are now being entered for late winter or early spring of 1911. As a whole the situation is tending toward conditions very similar to those prevailing last fall, when shops everywhere were congested with orders for a long time ahead. Manufacturers of agricultural machinery and implements, especially plow makers, are already providing augmented facilities for next season's output. In leading centers of the plow industry plans for re-equipping or enlarging plants were practically determined upon some time ago, and orders are now being closed on inquiries made in April or May. Further lists will be sent out during the summer, but most of the buying from this source is likely to be done in the near future.

Coal and ore handling machinery, the demand for which was thought to have reached its climax some time ago, is still being largely called for at various lake and ocean ports and also for operations at inland points on the great water ways and trunk lines where heavy bulk material of any kind needs to be transferred or taken to and from storage piles. Ore reduction plants in the West are among present buyers.

From the general industrial field there continues to be an excellent demand in the aggregate, even though weakness is shown here and there. From present indications trade during June will be fully as favorable as for May. The largest single percentage of orders is now for power and electrical machinery, as plants everywhere have found it necessary to secure increase of facilities in this respect, and plans for new construction usually embody provision for engines, turbines, generators, motors and subsidiary apparatus sufficient to take care of considerable future expansion.

The Ashland Gas & Electric Light Company's plant at Ashland, Ohio, which has a present power capacity of 200 kw., will be replaced by a new building equipped with the most modern machinery. This property is controlled by the American Gas & Electric Company, New York City.

The Black Diamond Boring Machine Company, Monongahela, Pa., is putting on the market apparatus of very simple construction for reboring armature or axle bearings, which can be used to considerable advantage in plants, traction lines, &c., operated by electric power, where motor repairs need to be frequently made.

Pittsburgh dealers expect to figure on considerable equipment for the new plant of the Vulcan Steam Shovel Company at Evansville, Ind., which is to be much larger in extent than the present works in Toledo.

Tate, Jones & Co., Pittsburgh, are calling attention to their Kirkwood combination oil burner, which they state will perform the same service with 25 per cent. less fuel than any type of low pressure or drip burner, for the reason that oil is atomized completely and combustion is perfect. Installations have been made for the Westinghouse companies of this city: Lima Locomotive & Machine Company, Lima, Ohio; Standard Steel Car Company at Hammond, Ind., and Butler, Pa.; General Electric Company, Keith Car & Mfg. Company, Midvale Steel Company and others.

The Dunlap Engineering Company, which succeeded to the business of the Columbus Pneumatic Tool Company, Columbus, Ohio, states that all of the orders for equipment to be used in its new plant have been placed.

The Black Fork Company, Black Fork, Ohio, will make improvements in its coal handling plant, including installation of a new elevator.

The experience of Bucyrus, Ohio, shows what it is possible to accomplish when the commercial interests of a place are in active co-operation to secure its industrial advancement. Within the past few months, as a result of such efforts, there have been located in that city the Sommer Motor Company, maker of automobile engines; the Ohio Locomotive Crane Company, the Kelley Mfg. Company, boiler and tank builders; the Chatfield Bending Works, the Bucyrus Foundry Company, the Van Loozen Multi-Printing Press Company and the Patterson Mfg. Company. A Western engineering firm, from whom this information was obtained, is considering the place as a location for one of its clients. Among the advantages offered is cheap fuel gas.

The Citizens Light & Ice Company, Huntington, W. Va., which is operating two Westinghouse alternating current generators of 350 kw., driven by Westinghouse gas engines, will provide 125 kw. additional by the installation of a new belted unit and other apparatus.

It is reported from Wellston, Ohio, that I. M. Poling of

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Dayton will let contracts in the near future for machinery and other apparatus to be used in opening up a new coal mine in Jackson County.

The Buckeye Wheel Company, Galion, Ohio, is well along with the addition to its plant, which will be used for the manufacture of automobile and motor truck wheels. Equipment needs have been provided for, but some additional apparatus will be required later.

The equipment of the Pittsburgh Contracting Company, Pittsburgh, will be augmented this season by a new crushing plant, including a large Kennedy breaker of the gyratory type.

Hench & Dromgold, York, Pa., whose principal business is the manufacture of implements, are also having an excellent trade this season in engines and machinery for sawmills, particularly in the South.

The Eller Mfg. Company, Canton, Ohio, is likely to require considerably enlarged production facilities before the end of the year, beyond what have been already provided, owing to the amount of business now being placed. The Southwest is a territory which has of late offered exceptionally good opportunities, on account of the great activity there in building operations.

The Exeter Machine Works, Pittston, Pa., is crowded with orders for machinery to be used in handling coal, ore, rock and sand, as well as other heavy bulk material, and the prospects for future business in this line were never better.

For ground breaking in construction work the Carnegie Plow & Mfg. Company, Carnegie, Pa., is turning out a giant plow which has met with particular favor in the West for work in hard clays and other material of a tough, stubborn character. The demand at present is such as to necessitate some extension of the manufacturing facilities of the plant.

The Sidney Electric Light & Power Company, Sidney, Ohio, which has several General Electric dynamos aggregating 300 kw., is planning to largely increase the capacity of the plant. A steam turbine set may be installed.

The Ellsworth Collieries Company, Ellsworth, Pa., will add somewhat to its electrical equipment.

The Connellsville Iron Works, Connellsville, Pa., manufacturer of boilers and boiler repairing, has in stock at all times electrical equipment for larries and complete equipment for any part of same can be shipped by the company on the same day the order is received.

The city of Fairmont, W. Va., has voted $69,000 for improvements to its water works system. The pumping station will be moved. Work, it is understood, will be commenced immediately. A. G. Martin is Mayor.

Detroit

DETROIT, MICH., May 31, 1910.

In the orders now being booked by dealers, tools for installation in automobile factories or plants of allied industries again predominate. There is buying both for immediate service and for greatly deferred delivery, with autumn dates very largely specified. Some of the principal motor car companies are proceeding along certain definite lines of expansion, and buying for plant equipment has apparently been reduced to a system that is almost automatic in its workings. With nearly every heavy machine or group of light tools a motor has come to be almost invariably specified; and this is usually of the induction type, alternating current, having displaced direct current in most of the modern automobile shops, or wherever constant speed tools are mainly used.

Foundry apparatus sells to excellent advantage, so far as it can be offered. The difficulty now is to get the equipment from manufacturers, whose facilities recently have been taxed to the utmost to meet the requirements of current business. Owners of stove factories who operate gray or malleable iron foundries have been among the heaviest buyers, and their needs seem to be only partially met.

Tools for use in all lines of the woodworking industries, including sash and door factories, interior finishing plants, planing mills, furniture factories, &c., are wanted now more than ever, combination machines being particularly called for. Some of the mills for which new equipment is needed are far behind on their own orders, and the latter seem to outstrip the facilities for filling them, no matter how fast these are provided. Hence it looks as though shops supplying such tools would be compelled to do much more in the way of enlargement.

The new plant of the National Steel Castings Company, to be erected at Montpelier, Ind., will be 60 x 80 ft., three stories, of steel and concrete construction.

Building contract has been let and machinery ordered for a new planing mill, 30 x 70 ft., to be erected at Iron River, Mich., by the Fisher-Morrison Lumber & Fuel Company.

A four-story factory, 40 x 105 ft., requiring boilers and a good deal of mechanical equipment, will be built this summer at Mt. Pleasant, Mich., for the E. B. Miller Company.

The H. Knapp Implement Company, Decatur, Ind., has decided upon the erection of a new three-story manufacturing plant, contracts for which will be let early in the summer.

A three-story addition, 40 x 100 ft., will be made to the factory of the Stout Furniture Company, Salem, Ind.

The Whitehead & Kales Iron Works, Detroit, is disposing of some of its machinery which has been displaced by heavier equipment.

An extension may be made this summer to the plant of the National Coil Company, Lansing, Mich. Possible arrangements are now being considered.

The Edward Ford Plate Glass Works is preparing to install a steam turbine unit of 200 kw. in the power house of its plant at Rossford, Ohio.

It is reported that extensive improvements are to be made in the plant of the Ann Arbor Waterworks Company, Ann Arbor, Mich., which has issued bonds for the purpose.

The Allyne Brass Foundry Company, Detroit, has been exhibiting at recent conventions a patented make of lead pipe with threaded couplings, which is now one of its standard lines.

A No. 4 gyratory breaker of the Gates pattern is to be added to the crushing equipment of the Michigan Alkali Company. The company's headquarters are in Detroit.

The Bates & Edmonds Motor Company, Lansing, Mich., is finding an excellent field this season in the Southwestern States for the sale of its gasoline engine-driven hoist, as well as other contractors' equipment, owing to the large amount of construction work now going on in that section.

The old shops of the Chicago Grand Trunk Railway, Port Huron, Mich., are to be occupied by the Cass Motor Company, which will establish one of the most extensive plants in the State. The details of works arrangement have not yet been fully determined upon.

The Hayes Ionia Auto Body Company, Detroit, whose acquirement of the Ionia Wagon Company's plant at Ionia, Mich., was recently mentioned, has bought the property outright and will proceed at once to install new machinery.

Perkins & Co., Grand Rapids, Mich., are reported to contemplate some increase in their machine shop facilities in order to keep up with the requirements of the trade. Inquiries from some parts of the country have fallen off lately, but there is a strong demand from others.

The Gaylord Motor Company, organized at Gaylord, Mich., to manufacture automobiles, is completing plans for the erection of factory buildings. Detroit capital is principally interested in the project, but a considerable amount was raised locally.

Considerable new machinery has been installed in the plant of the Hanson-Ward Veneer Company, Bay City, Mich., and further additions may be made in the fall.

The Reliance Motor Truck Company, Owosso, Mich., has acquired land for the additional shops which it is proposed to build. These will be 750 ft. long and two stories high.

An addition will be built this summer to the factory of the Eagle Tanning Company, Whitehall, Mich., and new machinery installed. Particulars may be obtained from the architect, C. E. Park, Detroit, who now has plans in hand.

A new foundry is to be built at Pontiac, Mich., by the Michigan Auto Castings Company, now organizing, in which Ferris Smith, son of Congressman S. W. Smith, is interested.

It is probable that, following the recommendations of an engineer engaged by the city for the purpose, some further additions will be made to the mechanical equipment of the water works system at Grand Rapids, Mich., where extensive improvements are already in progress.

Considerable electrical equipment, including a line of alternating current motors of the squirrel cage type, will be required for the mill of the Detroit Sulphite Pulp & Paper Company, Detroit.

If present plans are carried out the Flint Electric Company, which has a power plant of 2200 kw. at Flint, Mich., will purchase machinery to extend its capacity. Definite plans, however, have not yet been made, owing to the necessity of obtaining permission from the Public Utilities Commission of Michigan to provide funds for the contemplated improvements.

Recent shipments of Newten cupolas reported by the Northern Engineering Works, Detroit, include one to the Specialty Foundry Company, of 12 tons capacity per hour; two to the Ford Motor Company, each 9 tons; one to the Massey Gin & Machine Company, 5 tons; one to the Hamden Foundry Company, 3 tons, and one to the Orrville Pump Company, 7 tons.

The Anderson Carriage Company, Detroit, advises that information with reference to details of machinery and equipment to be installed in its new automobile factory can

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be secured of E. P. Decker & Co., Detroit, the contractors in charge.

The Ramsey-Alton Mfg. Company, Portland, Mich., is erecting an addition to its factory, which it will use for the manufacture of automobile bodies.

A four-story addition, 55 x 100 ft., will be made to the woodworking plant of the Grand Rapids Cigar Box Company, Grand Rapids, Mich., and provision made for electrical apparatus.

Milwaukee

MILWAUKEE, WIS., May 31, 1910.

There has been no appreciable change of late in the market for machinery, and equipment of every kind continues in excellent demand. Machine tools are showing especial activity. Terms of sale range from practically immediate delivery to contracts for nearly a year ahead, according to the nature of the apparatus and the character of the service for which it is required. Manufacturers of automobiles and automobile parts, including gasoline engines, are buying to a considerable extent for various works additions to be completed as far ahead as next spring. Makers of agricultural machinery and implements are a close second in this respect, but they usually want much earlier delivery. In most other lines of machinery building there is similar, although not so pronounced, activity. Good second-hand tools are wanted and these bring almost as much as new; in fact, there have been instances where the full list price was paid in order to secure some machine needed for immediate use.

The work of the repair shops has grown to such proportions and is now so profitable that a radical change in methods of equipment is gradually becoming observable. Formerly the cheapest tools were selected and they were made to cover just as wide a range of service as possible without especial regard to their fitness for it. This condition, of course, still obtains with reference to new concerns that are starting up in a very small way; but the shops that now have a trade which is sufficiently established to be dependable, or that have recently been organized with ample financial backing, are giving the same attention to the matter of operating economy that characterizes manufacturing plants; hence, new tools purchased are very generally of a better grade than heretofore and there have recently been a large number of replacements of inferior apparatus earlier installed. This applies to garage outfits, as well as to regular custom repair shops, although to a less degree, as that phase of the industry is still in its formative period.

A striking feature of the present situation is the increase in sales made abroad. This has been heretofore mentioned, but the percentage which such sales bear to domestic business has risen considerably over what it was even two or three months ago. Some interesting announcements along that line will be made by Wisconsin manufacturers within the next few weeks. As a rule, however, they hesitate to give out the facts in full, for the reason that foreign contracts are largely tentative in their character, the acceptance of a line of equipment being usually based upon the satisfactory performance of the first machine installed.

There is every prospect that manufacturers of woodworking machinery will be literally swamped with orders by next fall as a result of the present scarcity of material for finishing buildings. Dealers who supply contractors' needs in that line frequently find great difficulty in securing supplies and the situation is constantly growing worse. Establishments such as sash and door factories have recently placed largely increased facilities in service or are arranging to do so, but the situation is by no means being met. As a consequence further plant additions will be imperative, and it is predicted by one of the dealers here, who keeps well informed, that before the summer is over there will be such a scramble for woodworking machinery of every description as the country has never known. In Wisconsin this constitutes such a large element of the machinery trade that its effect will be felt in many directions.

The International Harvester Company has completed plans for a new foundry, 150 x 750 ft., to be erected at the intersection of Park street by Fourteenth avenue, just west of its present Milwaukee Harvester Works. Contracts are to be let about the middle of June. The equipment will be laid out principally with a view to making castings for gasoline engines, a very large production of which has been scheduled for the coming year. Steel and brick construction, with concrete flooring, saw-tooth roof, metal windows and other material of a fireproof character will be used.

The Badger Meter Mfg. Company, Milwaukee, is reported to contemplate an increase in its facilities for the making of disk meters, large contracts for which have been taken this season from all parts of the country. No definite plans to that end, however, have as yet been announced.

Dodge Bros., manufacturers of automobile parts, who are rearranging their Detroit plant and increasing its capacity, have placed orders in Milwaukee for the necessary power equipment, which will consist of two 22 and 30 x 36 in. heavy duty cross compound noncondensing Corliss engines, each direct connected to a 500-kw., three-phase, 60-cycle, 480-volt, 120 rev. per min. alternator. Exciter dynamos and a number of induction motors will also be installed at the same time.

Two new boilers and a fireproof dry kiln, 40 x 60 ft., will be added to the plant of the Northern Casket Company, in connection with an extension of the main factory building. Plans for construction and equipment have not yet been fully worked out, but contracts will be let shortly.

Included in the equipment of a new factory building which the Waltham Piano Company will erect in Milwaukee are boilers, engine and probably electrical machinery, together with the tools peculiar to that industry. Motors will be used for driving all apparatus, but whether current is to be purchased or generated on the premises does not appear to have been as yet decided. Construction contracts are about to be let and purchase of operating machinery will follow shortly.

The Grand Rapids Foundry Company, Grand Rapids, Wis., is making a specialty of coal chutes of the Roenius type for use in connection with buildings of all kinds, and the production thus far has reached nearly 18,000. A large increase in the company's facilities at an early date is looked for locally.

The Eclipse Feed Water Heater & Purifier Co., Oshkosh, Wis., which produces a closed heater of the double flow type, finds that the demand from all parts of the country is increasing, owing to the extent of the power plant building and improvement now going on, as well as to the wider introduction of its apparatus. Trade for the next few months, at least, cannot fail to be exceptionally good.

Power machinery for the Marshfield Brewing Company, the electrification of whose plant was recently mentioned, will be supplied through the Marshfield Water & Electrical Company, according to a report just received from Marshfield, Wis.

The new foundry of the E. B. Hayes Machine Company, Oshkosh, Wis., is nearly completed and a heating plant is about to be installed.

The new building to be erected at Beaver Dam, Wis., by the Beaver Dam Foundry Company, will be of brick and steel construction, one story, and equipped with the most modern machinery, electrically operated. A steam power plant, with tubular boilers, engines, electric generator, switchboard, &c., will be erected, and a line of constant speed motors installed. It is understood here that gray iron castings will be the company's principal product.

The 600-kw. electric plant of the Berlin Lighting, Heating & Power Company, Berlin, Wis., which is equipped with Westinghouse alternating current generators driven by Atlas and Vilter engines, has been sold to a new company known as the Public Utilities Corporation. Later on the plant will be enlarged and improved, but for the present it will be operated as heretofore.

Most of the equipment has been purchased for the new foundry of the E. N. Dickson Malleable Iron Company, and work on the building will be pushed. Temporary offices have been established in the Wells Building, Milwaukee, and Hugo Gutekunst, who will act as superintendent of the plant when finished, has his headquarters there.

Walter Blake, Appleton, Wis., has been awarded contract for the construction of the new bridge across the Embarrass River at New London, Wis.

The Garage Equipment Mfg. Company, which is now located at 400 Florida street, Milwaukee, has work well under way on its new manufacturing plant at the corner of Eleventh avenue and South Pierce street. Some of the machine tools and other apparatus needed have been purchased, but a part of the equipment is still to be bought.

The Globe Seamless Steel Tube Company has opened a temporary office in a vacant residence near the site of its new plant on Burnham street, Milwaukee, at the Western city limits.

It is reported from Oklahoma City, Okla., that the Oklahoma Railway Company, which originally installed engines of 1000 hp., built by the Filer & Stowell Company of this city, direct coupled to Westinghouse generators, will enlarge its power plant.

The Advance Mfg. Company, Racine Junction, Wis., which makes a specialty of metal stampings, is also turning out a good many special dies and tools this season for other concerns, so much so that this has come to be an important branch of its business.

The trade of the Milwaukee Bronze Casting Company, Milwaukee, has grown to such an extent that it has been found necessary to arrange for another story on its foundry, which covers a site 30 x 110 ft. The work will be done this summer.

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It is proposed at Sparta, Wis., to provide new boilers, pumping units and other apparatus for a modern municipal water service plant. The matter will be decided in the near future. The use of a gas producer and gas engine for driving the machinery will also be considered.

The Avery Scale Company, North Milwaukee, Wis., is finding one of the best markets for its product at present in the territory west of the Missouri River, where it is represented by the York Foundry & Engine Works, York, Neb., and B. P. Ordway, Board of Trade Building, Kansas City, Mo.

The extension of the Sheboygan Wood Turning Company's plant at Sheboygan, Wis., which contains five new machines, is now in service. It is probable that by fall current business will compel provision for some additional equipment.

The Badger Brass Mfg. Company, Kenosha, Wis., which is devoting special attention to lamps and other fittings for automobile service, will enlarge the coming season's output.

Work will begin this week on foundations for a new power plant, machine shop, assembling shop and inspection department extensions, which all together constitute a large addition to the works of the Thos. B. Jeffrey Company, Kenosha, Wis. The power equipment, which has already been mainly contracted for, includes boilers and furnaces, with automatic stokers, Corliss engines and alternating current generators. The shops additions will be 100 x 300 ft., 150 x 257 ft. and 200 x 257 ft., respectively, in the order named above. Later the drop forging department will be enlarged. New factory equipment has been principally ordered.

The W. N. Durant Company, Milwaukee, has been having a record year thus far in the sale of its automatic counters, which have been extensively introduced for industrial work of various kinds where an accurate count of machine output is required, both in this country and abroad. Foreign orders are handled chiefly through a London sales agency, where European countries or colonies are concerned.

The Milwaukee Electric Railway & Light Company, Milwaukee, which proposes to build and repair its own steel frame cars in future, will let contracts shortly for a large power house and an extensive group of shop buildings, the plans for which are now in progress. Equipment details have not yet been fully determined upon. Only invited bids will be considered.

The Power & Mining Machinery Company, Milwaukee, will supply Chilian mills, of the improved Evans-Waddell type, and other apparatus which constitutes a large order, for the new ore reduction works of the Ray Consolidated Copper Company, Kelvin, Ariz.

Boilers, electric generating set, motors and mechanical equipment of various kinds will be required for a new hospital building at Green Bay, Wis., the plans for which were made by Foeller & Schober of that city.

The Milwaukee Locomotive Mfg. Company, Milwaukee, is sending out heavy shipments of gasoline motor driven haulage machines for mining work and contractors' service, built for all gauges of track and to operate on any grade. As at present manufactured, the unit is very compact and high powered for its size.

It is reported from Eau Claire, Wis., that the new plant of the Linderman Box & Veneer Company may be built in another location nearer the source of supply, but efforts are now being made by the commercial interests of the city to retain the industry there. Plans of construction and equipment are expected to be decided upon shortly.

The Mechanical Appliance Company, Milwaukee, is making a specialty at this time of changing over belt driven systems of shop operation to motor drive, and there has recently been more activity in that direction than in any previous year.

Plans are now being drawn for the factory which the Wisconsin Automobile Radiator Company is to erect in North Milwaukee.

The installation of a new pumping engine has been authorized at Wausau, Wis., and steps will be taken shortly to effect the purchase of the unit, as well as of auxiliary machinery.

According to reports from Madison, Wis., the works of the Gisholt Mfg. Company, which is doing a heavy business in turret lathes and other shop tools, are to be largely extended, with the addition of considerable new equipment.

The J. I. Case Threshing Machine Company is preparing to erect a new foundry building, 100 x 800 ft., at Lakeside, in connection with its property there, which is on the outskirts of Racine, Wis. No contracts have as yet been placed. The plant is expected to have a capacity of 200 tons of finished castings daily.

The Smith Machine Company, Milwaukee, Wis., is erecting an addition to its plant, 100 x 100 ft., which will be equipped with motors and tools as occasion requires.

On account of the heavy demand for its line of tools, the Pribnow Swage & Tool Works, Mellen, Wis., intends increasing the capacity of its shop and is in the market for metal working machinery, such as gang drills, planer, miller and lathe. A. W. Pribnow is secretary and treasurer.

The South

CHATTANOOGA, TENN., May 30, 1910.

There has been no change of consequence in the conditions reported during the latter part of May. Trade is now rather quiet, but it is the quiet of humming industry and not of dullness, for manufacturing activity continues unabated and construction work has recently been started which it will take many months to complete. More representatives of Northern houses are now in the field than one ordinarily sees here at this time of the year, and, without exception, they seem to be pleased with the business being done. District offices have been opened in such cities as Atlanta, Birmingham and New Orleans by quite a number of Northern manufacturers who have only sent traveling men into the Southern States heretofore, and this is a pretty good indication of the importance which they now attach to the territory as compared with former years.

Steps are now being taken in many districts for further electrification of manufacturing plants, and a network of transmission lines from water power developments is radiating in every direction. There will, therefore, be increasing opportunities for the sale of motors, but with two or three exceptions those who produce these machines for the Southern market have not studied the requirements of the trade as they ought. Textile mills have nearly all adopted the induction motor, which may be of the same general characteristics of those used for other service. Operating conditions, however, require certain modifications of type, which need not be detailed here, and to serve the best interests of both seller and buyer, these conditions should be studied in advance. The mere substitution of a wound rotor machine for the more common type does not, for example, solve the difficulty. There are other features to be considered. The problem of suitable electrical control, especially where it is liable to be placed in the hands of ignorant labor, should also have attention. These phases of the present situation apply in a measure to all of the newly developed industries of the South; hence, they merit careful thought by all who are interested.

Birmingham, Ala., will have a new metal working plant, which is to be established by the Birmingham Turnbuckle & Forging Company. Plans for a shop and equipment have not yet, however, been wholly made.

It is a fact noteworthy of the rapidly growing importance of this section from a manufacturing standpoint that many concerns in the South now have a business which is country wide. Among others, the Casey-Hedges Company, Chattanooga, Tenn., has been very successful in this particular, even making extensive sales of boilers for service in power plants of mines, mills and smelters in the far West, notwithstanding the handicap of high freight rates.

The installation of pumping machinery and a modern system of water works is under consideration at Jonesboro, Ga. A vote on the proposition will be taken soon.

A small motor-driven pump and other apparatus will be required shortly at Phoenix, Ala.

Power timber cutting and planing mill machinery will be installed by the T. W. Cashen Lumber Company in a new plant to be erected this summer. The address given is Jacksonville, Fla.

The Chattanooga Armature Works, Chattanooga, Tenn., has recently developed a new taping machine which is being extensively introduced in electrical plants and repair shops.

A machine shop for emergency repair work will be installed by the Lake View Traction Company, Memphis, Tenn., in a building to be erected adjacent to its new power plant. Plans for the latter have also been completed and equipment contracts placed.

Bids will be received until June 21 by the city of Atlanta, Ga., for a pressure filter plant of 8,000,000 gal. daily capacity.

Interests identified with the Van Winkle Gin & Machine Company, Atlanta, Ga., have organized the Primo Motor Company, which will undertake the manufacture of complete automobiles, with the exception of the bodies and wheels, in its own plant. Shop facilities have already been largely provided, in connection with the Van Winkle works, and additional buildings are to be erected in due course.

A large addition will be made before fall to the factory of the Thomasville Chair Company, Thomasville, N. C., with consequent necessity for much new equipment, the plans for which have not yet been fully worked out.

The Atlas Machine Company, Nashville, Tenn., will in

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future represent the Southern Saw Works, Atlanta, Ga., in the sale of that company's product.

The Quick Unloading Car Chute Company, Birmingham, Ala., has recently made sales of its apparatus in every part of the United States and also in the West Indies, which shows something of the widespread character of the Southern manufacturing trade.

An electric power and lighting plant of about 75 kw. will be constructed for municipal service this summer at Warrenton, Ga.

Plans are expected to be made some time during the summer for a modern pumping plant and water works system at Fort Mill, S. C., although construction has not yet been authorized.

The power house and mill of the Alger-Sullivan Lumber Company, Century, Fla., which were destroyed by fire, will probably be rebuilt at once, involving the need of considerable equipment.

The Patten Mfg. Company, Chattanooga, Tenn., is finding a wide market in the South and West for its variable speed hoist, which is operated without clutches or shifting gears. This is particularly adaptable to double platform elevator service in construction work and can be operated by an electric motor.

The American Automatic Railway Switch Company, Birmingham, Ala., recently mentioned, has completed plans for a plant which will be erected in Birmingham for the manufacture of its patent railway switch. E. L. Penruddocke is engineer, with offices in the Brown-Marx Building, Birmingham, who will place orders for the necessary machinery.

The St. Johns River Terminal Company, whose main office is located at Macon, Ga., has completed plans for improvements at Jacksonville, Fla., which will embrace a yard office, 20 x 55 ft., a four-stall roundhouse, oil house, 16 x 26 ft., turntable, water softener plant and cinder pit. Considerable machinery will be installed for making light repairs. W. F. Kaderly, Macon, Ga., is superintendent of motive power and information as to machinery requirements may be obtained by addressing him direct.

The Northwest

ST. PAUL, MINN., May 30, 1910.

The market for machinery displays at this time a degree of activity which is in keeping with the general run of industrial conditions in the Northwestern States, where more has been done during the past few months to develop the natural resources of the country than was ever known before in the history of this section. Purchasing has settled down to a firm basis of reasonably constant demand, and wherever there is a lack of business in one direction it is made up in another. Dealers, therefore, who handle a variegated line of machinery, tools and other equipment, as most of them in this territory do, find that their total business for each month is generally satisfactory. It looks now as though the summer would be quite a busy one, and there is every reason to believe that industrial growth will be even more pronounced by fall.

The electric power and pumping plants at Brainerd, Minn., which are now separate, but have both passed under the control of the municipality, will be combined and enlarged. Purchase of new machinery will not, however, be made until after a thorough investigation of local conditions, for which the city has engaged a consulting engineer.

The Elk City Mines Corporation, recently organized by Spokane capitalists, will provide improved machinery for further development work in what has heretofore been known as the South Fork, or Espey, mine near Elk City, Idaho.

Electric motors will be installed for operating machinery in an elevator now being erected by the New Ulm Roller Mills Company, New Ulm, Minn.

The factory of the Decarie Incinerator Company, at Hopkins, Minn., has had an exceedingly busy season in the manufacture of refuse destructors, and the requirements of the country at large for apparatus of this character appear to be growing by leaps and bounds. Virginia, Minn., on the iron range, is the latest municipality to take up the subject.

The Union Light, Heat & Power Company, Fargo, N. D., which has 2500 hp. in Heine boilers, and power capacity of 1600 kw. from General Electric generators, was recently sold to the H. N. Byllesby Company, Chicago, which is expected to improve the plant. Current for operating the Fargo & Moorhead Street Railway Company is furnished from this station.

The Northwestern Stone Quarry Company, Rapid City, S. D., will install new crushing plant machinery, including a gyratory breaker, elevator, revolving screen and motor power. A contract covering the equipment has already been placed.

A number of alternating current motors of large size will be required for driving machinery in the works of the Dakota Plaster Company, Black Hawk, S. D.

A crushing plant equipped with 10 heavy stamps is to be installed on one of the properties of the Butte-Alder Gulch Exploration Company, Butte, Mont.

The Clark Cement Works, at Kenmare, N. D., which was visited by fire, will be rebuilt for considerably larger capacity and electric drive probably introduced.

In building the dam of the 99 Island plant of the Southern Power Company, which has just been placed in service, extensive use was made of machinery turned out in the shops of the American Hoist & Derrick Company, St. Paul, including 10 structural steel guy derricks. Each had a hoisting and handling capacity of 15 tons.

A pumping plant for public service will be built at Cimarron, N. D., by the Cimarron Water Company, which has just been organized for the purpose.

Machinery is to be provided shortly for a municipal power and pumping station at Raymond, Minn. The construction has been authorized and funds for the purpose will soon be available.

The H. W. Johns-Manville Company recently installed A. H. Allen, formerly of its Milwaukee works, as manager of its roofing department at Minneapolis.

The Winston-Dear Company is building a new machine shop in Hibbing, Minn., 40 x 110 ft., one story. It is stated most of the equipment has been provided for.

The Central West

OMAHA, NEB., May 30, 1910.

Trade for the past week or 10 days has been notably good, for the reason that work on new manufacturing plants, power stations and public improvements of different kinds has progressed to the point, in many instances, where equipment must be supplied. Much of the heavier apparatus needed was bought in the late winter or early spring, at the time plans were formulated; but there are many details still to be provided for, and quite a heavy percentage of these reached the purchasing stage only a short time ago, so that orders have been bunched. Other projects will also be maturing within the next few weeks, with the idea of having all construction work done in the summer or fall, as is usual at this season of the year; consequently the present level of the market is likely to be well maintained. The demand for equipment is now very general, no one line especially predominating. Deliveries can be made with reasonable celerity and collections are good, enabling manufacturers or dealers' funds to be turned over quickly.

It is remarkable the extent to which small metal working establishments are multiplying, and more remarkable still how much local work they find to do. Often these plants combine the functions of boiler, machine and forge shops; and not a few of them are turning out complete machinery of one sort or another. Gasoline engines, especially, are being built in a small way at an astonishing number of points, and they are good engines, seldom giving any trouble after being installed. The variety of tank and plate work turned out by local shops is also astonishing, considering the facilities possessed. Fabricating plants, which were established on a very minor scale only a year or two ago, are also coming to the front, but these supplement rather than compete with the large structural iron and steel works of the principal cities, and both classes of shops have practically all they can do to keep abreast of the demand occasioned by building operations. As a guide to the future of the equipment market, these facts are not without considerable significance.

Means of boosting the pressure in the city water mains are being considered at Sioux City, Iowa. The choice seems to lie between installing electrically driven centrifugal pumps at different points or providing a power air lift system. The addition of another pumping engine to the equipment of the main water works system is also contemplated.

The Dowden Mfg. Company, Ltd., Prairie City, Iowa, will erect an addition 40 x 120 ft. to its implement factory. Use for the present will be confined to storage.

The Knight Power Company, which is building a hydro-electric plant near Heber City, Utah, has ordered turbines and generators to furnish about 2500 kw., together with governors, exciter units, switchboard, transformers, motors and other apparatus. Some additional equipment may also be purchased later.

The American Wire Cloth Company, Clinton, Iowa, is stated to have had plans drawn for an extension of its plant.

A three-story warehouse building, 50 x 60 ft., with

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handling facilities, is being erected at Sioux City, Iowa, for the Sioux City Foundry & Mfg. Company.

The proposed building of a municipal pumping plant was recently defeated at Fairbury, Neb., as was also renewal of franchise to the local water company. The matter will have to be taken up again in the near future.

The Des Moines Bridge & Iron Company, Des Moines, Iowa, has been awarded the complete contract for water works at Mason City, Iowa.

The demand for the products of the Carr, Ryder & Adams Company, Dubuque, Iowa, has been so heavy throughout the spring months that it is a question whether the increased facilities for production offered by the large plant addition now under way will be sufficient to supply the trade readily obtainable, inasmuch as there seems to be no let up in prospect.

A steam turbine generating unit of 1000 kw. will soon be placed in service in what is known as the Jordan Station of the Utah Light & Railway Company, Salt Lake City, Utah, where an engine operated dynamo of 750 kw. was previously installed.

The extensive addition to the plant of the Farley & Loetscher Mfg. Company, Dubuque, Iowa, is nearing completion. Machinery has been provided for and will be installed shortly, but there is some apparatus to be purchased later on.

In the mining districts west of Denver considerable interest has been awakened lately in a very compact form of air compressor, for volumes up to 30,000 cu. ft. per minute, which is being introduced by the General Electric Company. This is of a novel centrifugal type and can be driven either by a motor or small steam turbine.

Among contracts recently taken by the Clinton Bridge & Iron Works, Clinton, Iowa, is one covering a large steel structure at Anamosa, Iowa.

The construction of a municipal pumping plant is under consideration at Kingsley, Iowa. A vote on the question is about to be taken.

The Dempster Mill Mfg. Company, Beatrice, Neb., will need one or more electric motors for driving machinery.

Construction of water works is under consideration at Alamosa, Colo. Gravity can be partially used in the system, reducing the need of pumping machinery.

The project for an electric power and lighting plant at Oakland, Iowa, to be operated by the city, will soon reach the stage where machinery is to be purchased. A dynamo set of 50 to 75 kw. is contemplated.

Bids are to be taken until June 17 on the construction of a hydroelectric power and pumping station for municipal service at Idaho Falls, Idaho, and purchase of equipment will follow. A small station is already in service.

The Hardsocg Wonder Drill Company, Ottumwa, Iowa, is putting on the market a type of drill which is especially adapted to block holing or hitch cutting in quarries and mines, as well as general service.

W. E. Malm is completing, near Georgetown, Colo., a large electrochemical plant, machinery for which has been ordered from Denver.

The Leadville Light & Power Company, Leadville, Colo., is preparing to furnish electric current for resumption of activity at the Anona mine, where some new operating equipment will be required in the near future.

The Carroll Roller Mills, Carroll, Iowa, will be in the market at intervals in future for electrical apparatus, having been changed over to motor drive.

M. M. Johnson, Clay Center, Neb., will build an electric power plant for public service. The generating unit to be installed will consist of an alternating current dynamo driven by a Corliss engine.

New bids will be taken at Orleans, Neb., on a two-stage centrifugal pump for city water service.

It is reported, although without direct confirmation, that the Dupont Company, with headquarters at Crested Butte, Colo., will build a hydroelectric plant and erect large ore reduction works there. The district is at present served with current by the Crested Butte Light & Water Company, through which information in relation to the new project can probably be obtained.

The Hard Cash Mining Company, Gunnison, Colo., has arranged to put in an air compressor and is also planning erection of a pyritic smelter.

The Fairbury Planing Mill, Fairbury, Neb., expects to make preparations for a largely increased output during the year 1911, which will probably necessitate installing additional equipment in the fall.

The Silver Bros. Iron Works Company, Salt Lake City, Utah, which operates what is stated to be the largest foundry, boiler and machine shop, as well as forging plant, between the Mississippi Valley and the Pacific Coast, has had a very liberal run of orders during the spring from all of the mountain States, and there are excellent prospects for future trade until far into the fall.

The Hampson-Fielding Engineering Company, Denver, Colo., has been entrusted with the preparation of plans for a hydroelectric power and pumping plant of 2500 kw. for the Grand Valley Fruit & Water Company.

The Goldfield Consolidated Mines Company, Goldfield, Nev., is preparing to install a transformer station of 1500 kw., to receive electric current at high potential from the hydraulic power plant at Bishops Creek, Cal., and convert it into working pressure for use in motors operating ore reduction machinery.

The Southwest

KANSAS CITY, MO., May 30, 1910.

Representatives of large machinery houses who have passed through here lately on return trips from Southwestern points are united in stating that opportunities for business were never better, so far as their experience is concerned; and this view accords with that of traveling men who make the territory regularly. Outsiders, who have never been in this section, are hardly able to comprehend the industrial expansion now taking place all along the line from St. Louis to Bisbee and beyond; nor can the future possibilities of the Southwest as a market for machinery be understood without a visit to the chain of progressive manufacturing centers now stretching along every railroad.

This, however, does not mean that business can be obtained by anyone with little or no effort. The conditions of trade are peculiar to the territory and vary materially in different parts of it. For the most part it can best be handled through dealers or manufacturers' agents, unless the volume is sufficient to justify branch offices; but actual acquaintance with the trade itself is the prime essential. Some Eastern houses who ignored this fact are said to have had unfavorable experiences, even to the point of abandoning the territory in disgust. The failure, however, lay with their methods.

At present dealers in the principal centers of distribution are enjoying a very even run of orders, and values are gradually reaching a slightly higher level, complaints of price cutting, which were heard some time ago, having practically ceased. Flour mills and grain elevators are now among the best customers of supply houses on account of preparations for handling the new crop. Besides operating machinery, power and electrical equipment, transmission apparatus, elevators, scales, car pullers and other mechanical devices used about such plants are in very active demand. Railroads are also fixing up their facilities at junctions where trains are made or broken, in anticipation of heavy grain traffic.

The city of El Reno, Okla., has awarded contract to the Des Moines Bridge & Iron Works, Des Moines, Iowa, for an elevated steel tank of 60,000 gal. capacity.

Plans for a city pumping plant at Tifton, Mo., will probably be carried out this summer.

The American Stove Company, St. Louis, Mo., will provide power plant equipment for its factory, including engine driven generating units of 400 to 450 kw., to furnish alternating current for operating motors in the works.

The authorities at Windsor, Mo., have engaged an engineer to prepare plans for a city pumping plant.

Included in the industries recently secured for Hope, Ark., through the pledging of support by local commercial interests are the Hope Metal Screen Mfg. Company and the Hope Box & Crate Company, which will be among future buyers in this section of machinery and other equipment.

The Thos. Cox & Sons Machinery Company, Little Rock, Ark., has placed with J. M. Long the complete equipment for a new timber cutting plant to be installed at Toledo, Ohio.

The Kansas City factory of Lewis & Kitchen of this city and Chicago has had a particularly busy season thus far in the year owing to the great extent of public improvements now being carried forward in all sections of the West.

The A. Leschen & Sons Rope Company, St. Louis, Mo., is working on an order from the United States Smelting & Refining Company for an aerial wire cable tramway to be erected at the Standard plant in Colorado City, Colo.

A Columbus gas engine of 50 hp. will be installed by the Canyon City Coal Company, Canyon, Texas, together with other machinery.

The installation of pumping machinery for municipal water service is under consideration at La Plata, Mo.

The United Verde Copper Company, Jerome, Ariz., is introducing an innovation in smelting practice by the use of the Knudson furnace, for the first time in this country, and the installation of oil engines of 800 to 1000 hp. combined capacity to operate blowers for the converters. The engines are of the Diesel type now manufactured by Adolphus Busch, St. Louis, Mo.

The power station of the Houston Bay Shore Traction

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Company, Houston, which is to be erected at La Porte, Texas, as recently reported, will be of 750-kw. capacity, and for generating units steam turbines seem to be favored.

The Russellville Water, Light & Power Company, Russellville, Ark., which is operating two General Electric generators of 300 kw., driven by an hydraulic turbine, will probably need to install some additional apparatus as the result of a franchise just granted to supply electric current to Dardanelle, 10 miles distant. A transmission line will also have to be constructed.

It is expected that contracts will be let before fall for an electric power and pumping station at Bryan, Texas.

The electric generating station of the Oklahoma Railway Company, Oklahoma City, Okla., which has a present capacity of 2500 kw. in steam driven units, will be furnished with considerable new machinery, including possibly a steam turbine set.

The A. Gilbert & Sons Brass Foundry Company, St. Louis, Mo., is taking a large number of orders at present for bronze axle bearings to be used in electric traction service, and inquiries from this field are steadily increasing.

The Heine Safety Boiler Company, St. Louis, Mo., has been given an order for three water tube boilers, aggregating upward of 1000-hp. capacity, for a power station to be erected by the Lake View Traction Company, Memphis, Tenn.

Machinery for municipal water works will be purchased in the near future at Krebs, Okla., where a bond issue for the purpose has just been sold.

Plans have been drawn for additions to be made to the plant of the Okmulgee Implement & Mfg. Company, Okmulgee, Okla.

It is reported from Nacogdoches, Texas, but without direct confirmation, that a Canadian concern, the Vandeventer Shuttle-Block Company, has acquired land there on which to erect a manufacturing plant.

The project of constructing a pumping station and laying water mains at Alvin, Texas, will be decided early next month. There seems to be no doubt, however, that the purchase of a steam or gasoline engine driven pump of moderate capacity will be authorized.

Plans are reported to be nearing completion for new shops and terminal facilities, necessitating considerable equipment, which the Chicago, Rock Island & Gulf Railway will provide at Amarillo, Texas.

The Carmen Cement Company has been organized at Carmen, Okla., to build a plant equipped with steel frame rotary kilns and other machinery for the manufacture of cement.

Chas. Duncan, Ponca City, Okla., will install a machine shop for repair work in connection with a garage about to be erected.

The Union Sheet Metal Works, Independence, Kan., has had numerous orders this year for special equipment to be used in industrial plants of various descriptions, such as blowpiping for planing mills, kiln draft tubes for cement works, &c. The application of sheet metal to purposes of this kind is increasing throughout the Southwest.

The Frisco Mines & Power Company, Kingston, Ariz., has ordered from Chalmers & Williams, Chicago, a No. 3 gyratory crusher.

Funds for a public service plant will be provided shortly at Harlington, Texas.

The Mexico Northwestern Railway Company, which intends building a branch road from San Antonio, on its main line, running west from Chihuahua to Cusihuiriachic, has placed contracts for an electric power station at Pearson, a new place named after Dr. F. S. Pearson of Chihuahua, Chi., Mex., who is largely interested in the project. B. H. Bryant, chief engineer of the company, whose headquarters are in the city of Chihuahua, has selected as the principal power equipment three horizontal steam turbines, reaction type, of 1500 hp. each, coupled to alternating current generators, and a full complement of auxiliary apparatus will be added. Construction work is to start at once.

The municipality of Garvin, Okla., is in the market for two 200-gal. duplex pumps, fitted with pressure regulating governors, one triplex pump and motor, fire hydrants, water gate valves, &c. Specifications may be obtained from the O'Neil Engineering Company, Dallas, Texas, or by addressing C. M. Carr, town clerk, Garvin.

The plant of the Alex. Kilpatrick & Sons Foundry Company, St. Louis, Mo., recently destroyed by fire, will be rebuilt immediately, and the company will be in the market for some foundry equipment.

The Automatic Stock Pump Company, Oklahoma City, Okla., is having plans prepared for a factory which will be located in some Western town. The company will manufacture all kinds of farm, mine and irrigating pumps and expects to employ about 300 men. It will be in the market at an early date for the necessary equipment. E. M. Hurry is secretary.

Government Purchases

WASHINGTON, D. C., May 31, 1910.

The Bureau of Supplies and Accounts, Navy Department, Washington, will open bids June 14, under schedules 2550 and 2552, for two motor-driven radial drills, Norfolk, Va., delivery, and under schedule 2557 for one generator set for Philadelphia, Pa. Schedule 2551 calls for eight sensitive bench drills, one No. 5 high power universal motor-driven milling machine and one No. 4 high power vertical motor-driven milling machine, all for delivery at Mare Island, Cal.

Bids were recently opened by the Engineer of the Third Lighthouse District, Tomkinsville, N. Y., for furnishing and delivering one universal milling machine as follows:

Brown & Sharpe Mfg. Company, Providence, R. I., $1122, accepted; Garvin Machine Company, New York, $1400 and $1050; Niles-Bement-Pond Company, New York, $1295; Hill, Clarke & Co., New York, $1200; Fairbanks Company, New York, $1334; Manning, Maxwell & Moore, New York, $1348; Prentiss Tool & Supply Company, New York, $1518.

The Bureau of Supplies and Accounts, Navy Department, Washington, opened bids May 24 for the following:

Class 71.—One 15,000-lb. improved steam drop hammer—Bidder 37, Erie Foundry Company, Erie, Pa., $6850; 84, Manning, Maxwell & Moore, New York, $6675; 87, Morgan Engineering Company, Alliance, Ohio, $6475; 106, Niles-Bement-Pond Company, New York, $7990.

Class 72.—For furnishing and installing in power house at Hingham, Mass., two electrically driven air compressors with motors and belts—Bidder 44, G. & W. Mfg. Company, New York, $3236.50 and $3781.50; 45, A. D. Granger Company, New York, $3338; 61, Hall Steam Pump Company, Pittsburgh, Pa., $3547.50 and $3672.50; 68, Ingersoll-Rand Company, New York, $3565; 77, Laidlaw-Dunn-Gordon Company, New York, $6670 and $7460, total; 109, Norwalk Iron Works Company, Norwalk, Conn., $3285; 114, Platt Iron Works, Dayton, Ohio, $3279, $3127.75 and $3052; 166, Westinghouse Electric & Mfg. Company, Baltimore, Md., $4625, total.

Class 123.—One electrically driven direct connected pump for Hingham, Mass.—Bidder 31, The De Laval Steam Turbine Company, Trenton, N. J., $270; 44, G. & W. Mfg. Company, New York, $471; 61, Hall Steam Pump Company, Pittsburgh, Pa., $475; 73, Charles J. Jager Company, Boston, Mass., $449; 84, Manning, Maxwell & Moore, New York, $230, $235 and $430; 103, National Electrical Supply Company, Washington, D. C., $450; 130, Charles J. Reinear, Philadelphia, Pa., $306; 132, Rumsey & Co., Seneca Falls, N. Y., $465; 163, Vermilye & Power, New York, $427.50; 178, Watson-Stillman Company, New York, $300; 195, Fairbanks Company, Washington, D. C., $417.

The National Steel & Wire Company's Affairs.—The court has approved the accounts of Homer Wise and Harold Nathan, the New York receivers of the National Steel & Wire Company, who were appointed in 1907. They stated in their petition that the liabilities were $1,783,898, with net nominal assets of $7,800,000 and small visible ones. The creditors have already received 30 per cent. of their claims and an additional 10 per cent. will be paid to them. The New York receivers now have in their possession $9375, which the court gave them permission to turn over to the principal receivers of the company in New Haven. The New York receivers asserted that by their administration they had saved $643,000 to the creditors and that the real estate and plant of the National Wire Corporation, a subsidiary concern of the National Steel & Wire Company, had been sold to the United States Steel Corporation for $650,000.

The Allegheny Steel Company, Pittsburgh, with mills at Brackenridge, Pa., has started work on a new open hearth furnace. It will be known as No. 6, will have a capacity of about 90 tons, and is expected to be in operation by September 1. The new additions to its tube department, where the company makes its well-known brand of Reliance lapweld boiler tubes, was placed in operation May 15. This department is being operated to full capacity, part of the output being used for stocking up the new warehouse, so as to facilitate the prompt shipment of boiler tubes. The company is again operating its plate mill to greater capacity, while its operations in the sheet mill, washer and steel casting departments are being steadily maintained.

The new blast furnace of the Worth Brothers Company, Coatesville, Pa., recently blown in, has been operating quite satisfactorily, turning out as high as 332 tons of basic iron in 24 hours.

April Exports and Imports of Iron and Steel

The report of the Bureau of Statistics of the Department of Commerce and Labor for April shows a decrease in both exports and imports of iron and steel as compared with March. The value of the exports of iron and steel and manufactures thereof, not including iron ore, was $16,529,254 in April, against $17,258,503 in March, while the value of similar imports was $3,710,614 in April, against $4,079,763 in March.

The exports of commodities for which quantities are given totaled 117,918 gross tons in April, against 124,753 tons in March. The details of the exports of such commodities for April and for the 10 months of the fiscal year ending with April are as follows, compared with the corresponding periods of the previous year:

Exports of Iron and Steel.

	April,		Ten months ending April.	
	1910.	1909.	1910.	1909.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	11,757	2,206	63,103	37,211
Scrap	1,764	2,154	10,824	17,373
Bar iron	1,749	838	12,587	9,238
Wire rods	4,562	2,059	20,608	9,768
Steel bars	7,227	5,709	72,861	40,698
Billets, blooms, &c.	168	11,857	49,133	84,776
Hoop, bands, &c.	510	238	4,058	2,944
Steel rails	19,732	18,246	308,670	182,521
Iron sheets and plates	8,904	6,598	79,060	45,624
Steel sheets and plates	14,101	9,732	115,653	62,281
Tin and terne plates	1,339	556	9,457	3,824
Structural iron and steel	15,441	6,346	88,722	87,011
Barb wire	7,128	5,595	60,504	55,517
Wire	8,031	7,171	64,776	54,944
Cut nails	535	1,034	7,418	6,186
Wire nails	3,895	2,077	29,096	22,768
All other nails, including tacks	433	457	6,480	5,494
Pipe and fittings	10,642	18,032	137,477	106,524
Totals	117,918	100,905	1,140,487	834,702

The imports of commodities for which quantities are given totaled 51,438 gross tons in April, as compared with 57,150 tons in March. The details of such imports for April and for the 10 months ending with April, as compared with the corresponding periods of the preceding year, are as follows:

Imports of Iron and Steel.

	April,		Ten months ending April,	
	1910.	1909.	1910.	1909.
	Gross tons.	Gross tons.	Gross tons.	Gross tons.
Pig iron	24,034	8,117	202,201	85,285
Scrap	4,255	245	113,117	4,490
Bar iron	4,967	755	25,460	13,550
Rails	1,147	85	6,304	1,286
Billets, bars and steel in forms n.e.s.	5,308	922	30,912	10,516
Sheets and plates	1,422	388	5,964	2,818
Tin and terne plates	5,619	5,894	56,466	40,237
Wire rods	2,092	914	11,866	9,828
Structural iron and steel	2,594	393	8,242	5,321
Totals	51,438	17,713	460,532	173,331

The imports of iron ore in April were 206,135 gross tons, against 163,633 tons in March and 74,782 tons in the month of April, 1909. The total importations of iron ore for the 10 months ending with April were 1,947,428 gross tons, against 793,540 tons in the corresponding period of the previous year. Of the April imports of iron ore, 141,100 tons came from Cuba, 52,675 tons from Europe and 12,360 tons from British North America.

The total value of the exports of iron and steel and manufactures thereof, not including ore, for the 10 months ending with April, was $144,971,934, against $118,207,254 in the corresponding period of the previous year. The total value of similar imports in the 10 months ending with April was $31,947,937, against $17,733,777 in the corresponding period of the previous year.

The Edgewater Iron Company, operating the Lebanon Valley Furnace, formerly owned by the Lebanon Valley Furnace Company, at Lebanon, Pa., will blow out its furnace, it is stated, on June 1, when extensive repairs will be made.

The Master Boiler Makers' Fourth Convention

The fourth annual convention of the International Master Boiler Makers' Association was held at Niagara Falls last week, closing May 27. It is stated to have been the most successful and in all respects the most satisfactory ever held, the attendance being larger, the number of new members enrolled greater and the proceedings of exceptional value.

Col. E. D. Meier, New York, president of the American Boiler Manufacturers' Association, made an address on the progress and development of boiler construction, the duty and responsibility of individual boiler manufacturers and future possibilities. Other interesting addresses were made and papers read. It was agreed unanimously that the use of a flexible staybolt is the best method known for relieving expansion in locomotive boilers.

The association went on record as opposed to the bill pending in Congress which gives to the Interstate Commerce Commisison authority to make, alter or amend rules and regulations for testing locomotive boilers, declaring that "the bill provides for a system of inspection that is impossible of execution, with the force that will be available, thus rendering it absurd and useless."

Officers for the ensuing year were elected, as follows: President, A. N. Lucas, Milwaukee; vice-presidents, George W. Burnett, Albany; J. W. Kelly, Chicago; T. W. Lowe, Winnipeg; John T. Johnson, Los Angeles; F. A. Linderman, Albany, N. Y.; secretary, H. D. Vought, New York; treasurer, Frank Gray, Bloomington, Ill. Members of the Executive Board: M. O'Connor, Missouri Valley, Iowa; J. R. Cushing, Bellfontaine. Omaha was selected as the place of meeting next year.

Western Freight Advances Halted

HANNIBAL, Mo., May 31.—Twenty-four Western railroads and the Western Trunk Line Committee were temporarily restrained to-night by United States District Judge David P. Dyer from enforcing or making a general advance in interstate freight rates, scheduled to take effect to-morrow, June 1. The injunction was granted on a petition filed by the Government on the allegation that the advances in rates were agreed upon by the defendants without competition and in violation of the Sherman act.

This action followed a decision reached in Washington to-day by President Taft and Attorney-General Wickersham to act on the complaint made by a committee of Western shippers yesterday and to prevent, if possible, the inauguration of the increase rates. It was announced to-night that the date for the hearing on the restraining order will be fixed at St. Louis to-morrow.

The petition was filed in the United States Circuit Court at St. Louis this afternoon and was brought here to present to Judge Dyer, who is holding a session of the United States District Court. It stated that unless such a restraining order were issued the proposed advances would become effective at midnight to-night, "to the grave harm and injury of the people of the United States."

The Australian Iron Bounty.—Consul-General John P. Bray of Sydney reports the iron bounty paid under the manufacturers' encouragement act by Australia during the six months ending December 31, 1909, as follows: Pig iron, 19,323 tons, $56,347; steel, 897 tons, $2618; puddled bars, 991 tons, $2890; galvanized sheets, 141 tons, $971; wire netting, 1513 tons, $12,383; total, 22,865 tons, $75,209.

The Testing Society's Meeting at Atlantic City, June 28-July 2

The programme of papers to be read at the thirteenth annual meeting of the American Society for Testing Materials at Hotel Traymore, Atlantic City, N. J., June 28-July 2, 1910, is given below. The morning sessions will begin at 10 o'clock, the afternoon sessions at 3, and those of the evening at 8. Wednesday afternoon and Friday evening are reserved as recreation periods, and the annual engineering smoker will be held.

TUESDAY AFTERNOON, JUNE 28.

Report of Committee A-3: On Standard Specifications for Cast Iron and Finished Castings. Walter Wood, chairman.

"Tests of Cast Iron Arbitration Test Bars." C. D. Mathews.

"Some Recent Tests of Cast Iron." A. E. Outerbridge, Jr.

"Notes on the Annealing of Steel Castings." Albert Sauveur.

"Untruly and Unevenly Chilled Car Wheels." T. D. West.

Report of Committee E-1: On Standard Methods of Testing. Gaetano Lanza, chairman.

Report of Committee B-1: On Standard Specifications for Hard Drawn Copper Wire. J. A. Capp, chairman.

"The Forest Products Laboratory, Its Purpose and Work." McGarvey Cline.

TUESDAY EVENING, JUNE 28.

"The Closing of Blowholes in Steel Ingots." Henry M. Howe.

"Measured Strains in a Steam Boiler Under Hydrostatic Tests." James E. Howard.

"Copper Clad Steel, Its Metallurgy and Properties." Wirt Tassin.

"Tests on Steel and Wrought Iron Beams." H. F. Moore.

"Strength of Steel from I Beams." E. L. Hancock.

WEDNESDAY MORNING, JUNE 29.

On Steel.

Report of Committee A-1: On Standard Specifications for Steel. William R. Webster, chairman.

"Low-Carbon Streaks in Open Hearth Rails." M. H. Wickhorst.

"Elongation and Ductility Tests in Rail Sections Under the Manufacturers' Standard Drop-Testing Machine." P. H. Dudley.

"The Influence of Titanium on Segregation in Bessemer Rail Steel." G. B. Waterhouse.

"Cupro-Nickel Steel." G. H. Clamer.

"Test of a Structural Steel Plate Partly Fused by Short-Circuited Electric Current." A. W. Carpenter.

Report of Committee A-8: On Standard Specifications for Cold-Drawn Steel. C. E. Skinner, chairman.

"Further Notes on the Heat Treatment of Steel." Wm. Campbell.

WEDNESDAY EVENING, JUNE 29.

Memorial Session.

In honor of the memory of Dr. Charles B. Dudley, late president of the International Association for Testing Materials and of the American Society for Testing Materials.

The Life and Life-Work of Charles B. Dudley—1842-1909. R. W. Lesley, vice-president of the society, will say an opening word on behalf of the Executive Committee.

As a Railroad Man. Theodore N. Ely.

As a Chemist. Edgar F. Smith.

As a Metallurgist. Henry M. Howe.

As a Mentor. B. W. Dunn.

As a Citizen. W. H. Schwartz.

A Personal Tribute. R. W. Hunt.

THURSDAY MORNING, JUNE 30.

On Cement and Concrete.

Report of Committee C-1: On Standard Specifications for Cement. George F. Swain, chairman.

"Aluminates: Their Properties and Possibilities in Cement Manufacture." Henry S. Spackman.

"The Effect of Sodium Silicate Mixed With or Applied to Concrete." Albert Moyer.

"Comparative Tests of Lime Mortar, Both in Tension and Compression; Hydrated Lime and Sand, Lump Lime and Sand, and Cement Lime and Sand." E. W. Lazell.

"Tests on Reinforced Concrete Columns Subjected to Repeated and Eccentric Loads." M. O. Withey.

"The Distribution of Stress in Reinforced Concrete Beams, Including a Comparative Study of Plain Concrete in Tension and Compression." A. T. Goldbeck.

"A Sand Specification and Its Specific Application." W. A. Aiken.

THURSDAY AFTERNOON, JUNE 30.

On Preservative Coatings and Oils.

Report of Committee D-1: On Preservative Coatings for Structural Materials. S. S. Voorhees, chairman.

Report of Committee A-5: On the Corrosion of Iron and Steel. A. S. Cushman, chairman.

"A Method for Testing the Protective Power of Paints When Applied to Iron and Steel." W. H. Walker and M. T. Jones, Jr.

"Another Solubility Test on Protective Coatings." G. W. Thompson.

"Vermilion Paint for Railway Signals—Results of an Investigation." Robert Job.

"The Painting of Cement and Concrete Structures." Charles MacNichol.

"Classification of Fine Particles According to Size." G. W. Thompson.

Report of Committee D-2: On Standard Tests for Lubricants. A. H. Gill, chairman.

Report of Committee D-3: On Standard Methods of Analysis of Fats and Oils. C. N. Forrest, chairman.

FRIDAY MORNING, JULY 1.

On Testing Machines and Apparatus.

"The 600,000-Lb. Testing Machine of the University of Wisconsin." H. F. Moore and M. O. Withey.

"The Scleroscope." A. F. Shore. Followed by a general discussion on "Tests of Metals for Hardness," to be opened by A. F. Shore, Bradley Stoughton and A. S. Sauveur.

"Some Testing Laboratory Accessories." J. Madison Porter.

"Brinell Ball Test Applied to Wood." W. K. Hatt.

"Apparatus for Repeated Loads on Concrete Cylinders and a Typical Result." H. C. Berry.

"An Autographic Rubber-Testing Machine." T. Y. Olsen.

"The Work of the Structural Materials Testing Laboratories During the Past Year." R. L. Humphrey.

An exhibit of photographs and drawings of testing apparatus, contributed by the Testing Laboratory of the Engineering College of the University of Wisconsin, will be made at this session.

FRIDAY AFTERNOON, JULY 1.

"The Determination of Soluble Bitumen." Prévost Hubbard and C. S. Reeve. Discussion opened by S. R. Church, A. W. Dow, W. H. Fulweiler, Clifford Richardson and Albert Sommer.

"Improved Instruments for the Physical Testing of Bituminous Materials." Herbert Abraham.

"Necessary Reforms in Specifications for Petroleum Products." Albert Sommer.

"A New Machine for Testing Pitch." T. Y. Olsen.

Report of Committee D-8: On Waterproofing Materials. W. A. Aiken, chairman.

Report of Committee D-9: On Standard Tests of Insulating Materials. C. E. Skinner, chairman.

Report of Committee D-5: On Standard Specifications for Coal. J. A. Holmes, chairman.

"Fuel Investigations, U. S. Geological Survey; Progress During the Year Ending June 30, 1910." J. A. Holmes.

SATURDAY MORNING, JULY 2.

Report of Committee C-3: On Standard Specifications for Paving and Building Brick. L. W. Page, chairman.

Report of Committee D-4: On Standard Tests for Road Materials. L. W. Page, chairman.

Report of Committee C-4: On Standard Specifications for Vitrified Clay and Cement Sewer Pipe. Rudolph Hering, chairman.

Report of Committee D-7: On Standard Specifications for the Grading of Structural Timber. H. Von Schrenk, chairman.

Report of Committee A-6: On the Magnetic Testing of Iron and Steel. J. W. Esterline, chairman.

"A Comparison of Magnetic Permeameters." Charles W. Burrows.

"The Exponential Law of Endurance Tests." O. H. Basquin.

Miscellaneous business.

The election of officers will be held Tuesday afternoon, June 28. The ballot as prepared by the nominating committee and now in the hands of members is as follows: For president, Henry M. Howe; for vice-president, R. W. Lesley; for secretary-treasurer, Edgar Marburg; for member of the executive committee, James Christie.

The International Tool Steel Company, Ltd., has been formed at Toronto, Canada, with offices in the Traders' Bank Building. It proposes to produce exclusively high carbon tool steel from magnetic iron sands, operating its patented process and appliances. The process is direct, consisting of combined reduction and crucible furnaces. J. E. Murphy is president; Manson Campbell, vice-president, and W. J. Chapman, secretary and treasurer.

The monthly meeting of the Pittsburgh Foundrymen's Association will be held at the Fort Pitt Hotel on Friday evening, June 3. The meeting is expected to be attended by Arthur T. Waterfall, president, and Dr. Richard Moldenke, secretary, of the American Foundrymen's Association, and Dr. Frank T. Stevenson, chairman of the Reception Committee, Detroit, who will give an account of the arrangements being made for the approaching convention.

Brittleness in Mild Steel

Nitrogen Not Responsible, as Claimed by C. E. Stromeyer

BY G. B. WATERHOUSE, PH.D.

Mr. Stromeyer's recent paper before the Institution of Naval Architects, London, Eng., on the above subject (*The Iron Age*, April 14, 1910, page 858), is of considerable interest, coming as it does from one so closely in touch with the use of mild steel plate. It is to be commended in that it directs attention to the important influence that small amounts of nitrogen may have on steel, and for the impetus it will give to research on this important point.

A very interesting discussion by correspondence with the secretary of the Institution of Naval Architects took place on the paper, dealing altogether with the influence of nitrogen, and this may be abstracted. Professor Heyn, the prominent German metallurgist, criticised the method of taking the samples for analysis. He considered that the effect of the nitrogen required further careful study to determine whether it was itself the cause of brittleness, or whether it was merely an indication of the presence of harmful constituents which usually occur in conjunction with nitrogen, such as segregations of sulphur, oxygen compounds, and gases. E. H. Saniter, the last Bessemer medallist of the Iron and Steel Institute, subjected Mr. Stromeyer's tables to very careful analysis. His résumé of previous results on nitrogen is well worth quoting and is given below:

Percentage of Nitrogen in Steel.

Year.	Chemist.	Material.	N. Per cent.	P. Per cent.	As. Per cent.	C. Per ct.
1880	Allen...	Dannemora steel...	0.0179	....	....	..
		Crucible steel.....	0.008	....	....	..
1896	Harbord and Twynam.	Various steels.....0.006 to 0.027		....	....	..
	Same...	Normal rail.....	0.017	0.061	0.033	..
	Same...	Good tube.....	0.025	0.027	0.015	..
1906	Braune.	Best Swed. iron...0.006 to 0.008		....	....	..
1907	Saniter.	Various steels.....0.006 to 0.021		....	....	..
	Same...	Normal axle steel.	0.015	0.06	0.031	0.25

Braune, who has done the most work on the subject, considers that 0.06 per cent. is necessary to embrittle soft steel. In all four of the above investigations, made by different men and extending over a period of nearly 30 years, the minimum nitrogen found was 0.006 per cent.

If Mr. Stromeyer's samples with above 0.06 per cent. phosphorus are excluded, 16 out of the remaining 20 show less nitrogen than this minimum amount. Two of the remaining four show 0.007 per cent. and are as low as the best Swedish iron. There remain Q with 0.02 per cent. and L with 0.0153 per cent., which are met by Harbord's good tube, with 0.024 per cent., and Saniter's good axle with 0.015 per cent.

In view of the foregoing, it is quite evident that nitrogen alone, in the quantities found in Mr. Stromeyer's steels is not by any means the injurious element suggested. It seems to the writer that the communications of Heyn and Saniter referred to above, especially the latter, fully answer Mr. Stromeyer's remarks on the drastic influence of nitrogen. It is clear that much further work must be done before emphatic statements can be made.

Results at Buffalo with Ferrotitanium Alloy Steel

Mr. Stromeyer also appears to question greatly whether the use of titanium, either as an alloy or in the form of pure metal, brings about any benefit in steel. On this point the writer can speak from personal experience. It has been his good fortune to be in the closest touch with the manufacture of over 140,000 tons of steel, in the making of which about 1,310,000 lb. of ferrotitanium alloy has been used. The most suitable contents of titanium in this alloy have been found to be from 10 to 14 per cent. If higher than this, the melting point of the alloy is increased so that it is not readily absorbed by the molten metal. Using an alloy with less than this percentage has not given any further advantage. As to the amount of nitrogen removed from the metal by the use of the alloy, conclusive and definite experiments have not been made. One day the iron gave 0.015 per cent. nitrogen and the finished steel 0.007 per cent.; another day 0.021 per cent. and 0.014 per cent. respectively, and on still another day 0.015 per cent. and 0.014 per cent. What evidence there is, therefore, points to improvement in this respect.

Most of the steel has been acid Bessemer rail steel, and many very careful experiments have been made on this material. By means of splitting open ingots it has been thoroughly proved that carefully made steel, finished with the use of ferrotitanium, is sound and free from the blowholes found even in good steel. It is true that there is a slightly larger central pipe, but it is usually situated slightly nearer the top of the ingot, so that the same amount of crop will give sound steel. Advantage has been taken of these split open ingots to make thorough investigations as to the amount of segregation of the various metalloids, and it has been found that the steel treated with the alloy shows much less segregation than the ordinary steel. These results are so striking that the writer hopes to publish them in the near future. They have been checked by taking all the rails from two ingots, one of ordinary steel, and one of treated steel, taking drillings from each series of rails in exactly similar locations, and making careful analysis. Here also the treated steel exhibits less segregation than the ordinary steel.

Improvement has also been noticed in the working of the steel in the rolling mills; and although the time has been short during which the rails have been in service on the different roads they have been found to give much better service than ordinary Bessemer steel rails.

Labor Notes

The Light Inspection Car Company, Hagerstown, Ind., has just distributed $2500 among its 150 employees, following its custom. It gives other sums at Thanksgiving and Christmas, based on efficiency and length of service. The company conducts an annual outing for its employees, their families and friends, and also holds an annual banquet. It has had its plant in operation 15 years without a shutdown and has not had a strike or been forced to reduce wages. It has advanced wages several times.

Difficulties with the machinists of the Jeansville Iron Work Company, department of the International Steam Pump Company, Hazelton, Pa., who asked for a nine-hour instead of a ten-hour day, were adjusted by arranging a straight nine-hour day, or 54 hours a week, instead of 55 hours under the previous arrangement. The men have returned to work.

Employees at Fannie Furnace of M. A. Hanna & Co., at Sharpsville, Pa., have been granted an increase in wages, ranging from 6 to 10 per cent.

A conference on the puddling and finishing wage scales for the bar iron mills that sign the Amalgamated scale opened in Detroit on Wednesday, June 1, representatives being present from the Western Bar Iron Association and the Wage Committee of the Amalgamated Association. In the scales prepared by the latter slight advances are asked in puddling and finishing, 10 per cent. in tin plate and nearly 10 per cent. in the sheet scale. It is probable that after the conference with the Western Bar Iron Association, a meeting will

be had with the Republic Iron & Steel Company, which signs the scale for most of its bar iron mills in the West, and later with the sheet and tin plate concerns, only a few of whom still sign the Amalgamated scales. It is probable that the requests for advances in wages for puddling and heating, and also in the tin plate and sheet scales will be opposed by the manufacturers.

A Comparison of Electric Furnaces

Features of the Girod and Heroult Types

Dr. W. Borchers, Aix la Chapelle, Germany, is the author of a paper on "The Girod Furnace," read at the meeting of the Iron and Steel Institute at London, May 4. It is identical with the paper by Dr. Borchers presented at the Pittsburgh meeting of the American Institute of Mining Engineers in February. At the London meeting the paper was discussed at some length. J. W. Heap referred to the excellent opportunity steel manufacturers in Middlesbrough have for experimenting with the electric furnace in the manufacture of steel. With waste gas they have as cheap a power unit as anywhere in the world. Steel makers on the continent using hydraulic power pay more for electricity, he had found, than it would cost the pig iron manufacturer in Middlesbrough. He regretted that Dr. Borchers had not given a general summary of the performance of electric furnaces, instead of giving the performance of but one. He did not find in the paper reason for thinking the Girod furnace the simplest form of electric furnace. The paper had referred to the contact pieces as a special feature. The speaker doubted if these would last long, even in spite of the arrangement for annealing. The author had seemed to take it for granted that there would be a circulation of the contents of the bath. One of the best known metallurgists in France had spent considerable time in finding a means for promoting such circulation, and his latest method was an inclined connecting channel, simply devised. The speaker expressed surprise that it had been left to Sheffield to take up the electric furnace, as he considered Sheffield by no means the ideal place. The requirements are, first, cheap power, and, second, cheap material. The most obvious means of utilizing the electric furnace, he thought, was to take a low grade steel and refine it so as to make high grade steel. Sheffield manufacturers in adopting the electric furnace had the same limitations in materials to which they were subjected in the manufacture of crucible steel.

E. H. Saniter thought the comparison made by the paper between the Girod and the Heroult furnace quite incomplete. He would like to have the author answer the question whether the Girod furnace consumes 1 kw. less current to the ton of steel than the Heroult furnace. He found in the paper only two reasons given for thinking the Girod furnace the better type; first, because there is only one hole through the roof and one electrode, and, second, the author's reference to the resistance of the bath increasing the heat. The resistance of the molten metal in the bath, the speaker said, plays a very small part in the heat generated. In comparing the two furnaces, the reaction in the Heroult furnace was three times as great.

Sheffield and Electric Steel

Prof. J. O. Arnold, referring to the comparison between Middlesbrough and Sheffield for the best results with the electric furnace, said that what Sheffield manufacturers had to consider was the relative melting capacity of the 200-year-old crucible and the electric furnace. They are not seeking a refining machine, but a melting machine. The material used remains the same, the best Swedish iron. The whole question at issue is whether the electric furnace will melt more steel than the crucible and give steel of as high quality.

F. W. Harbord said he had seen the Girod furnace at Ugine and that it had worked very satisfactorily. He was surprised, however, that Dr. Borchers should refer to it as the simplest form of electric furnace. It had the advantage over the Heroult of one electrode through the roof instead of two, thus lessening interference with the bath of metal and giving more room. But this did not apply to the large furnace. With the larger type of Girod furnace they had to have two electrodes, taking up furnace space, and in some cases three or four. He found nothing in the advantage claimed for bottom electrodes and circulation of bath. Various furnaces claim special advantages regarding circulation. In large steel furnaces, say 200 tons, there is sufficient circulation to give regular material, and that without electric current. He did not consider that in a furnace of as small a size as the usual electric furnace the circulation is of any importance, the reaction going on in the bath giving quite sufficient circulation.

Heroult Furnace Operations

D. F. Campbell, who said he had had a good deal of experience with electric furnaces, had seen those in operation at Ugine. He did not find that the figures in the paper in any way justified the opinion that the Girod furnace is the simplest. Comparing a 12½-ton Girod furnace with the 15-ton Heroult furnace at work at South Chicago, they would find in the former four holes in the roof and 16 electrodes in the bottom. These holes in the bottom, he considered, much more likely to be a source of trouble than those in the roof. The 15-ton Heroult furnace has three holes in the roof, while the bottom is exactly like that of the most improved basic open hearth furnace. The author had said that the metal itself becomes an important source of heat. The speaker would say that the sources of heat are electricity and the chemical reaction which takes place.

The essential object of this type of furnace is the slag reaction. Getting the slag exceedingly hot gives thorough refinement of the bath, and he thought there would not be the least question about getting ample motion in the steel in any type of electric furnace. A feature of the Girod furnace which he believed would not appeal to the practical steelmaker is the holes in the bottom, which were liable to become centers on which the dolomite lining would rest, while the steel is liable to get under the layers of dolomite. In the furnaces at South Chicago, or the Heroult furnaces in Germany, the bottom lasts about 4000 to 5000 heats, with, of course, ordinary fettling after each heat. The roof, which is made of silica brick, is very easily moved, and usually lasts from 100 to 150 heats. The cost of a roof for a 15-ton furnace is about £12, and that would make 100 heats of 15 tons, which works out at about 2d. a ton for roof.

Chas. G. Stevens & Co., 17 North Canal street, Chicago, have purchased a lot at the northeast corner of Monroe and Jefferson streets, and will erect a new building, the first floor and basement of which will be used for their stock of iron and steel. This will afford much larger facilities for business than are now available. The latest improvements in racking will be installed. The building is expected to be ready for occupancy by July 1.

The National Foundry & Machine Company, Connellsville, Pa., builder of Springer patented single acting, double plunger pumps for mine service, boiler feed, &c., is installing a new 9-ton hand power crane in its machine shop. It is building a hand power glass press for the National Glass Brick Company, Connellsville, Pa., and has considerable business booked for gray iron castings.

Personal

Joseph G. Butler, Jr., Youngstown, Ohio, has been elected president of the Chamber of Commerce of that city. Thomas McDonald, general superintendent of the Carnegie Steel Company, at Youngstown, is vice-president.

Charles C. Heald, for nearly 30 years connected with the Union Malleable Iron Company, having been its superintendent for 19 years, has retired from active business, though he is still treasurer of the company.

The Pawling & Harnischfeger Company, Milwaukee, Wis., designer and builder of electric cranes and hoists, has appointed Albert B. Bowman, 720 North Second Street, St. Louis, Mo., a special sales representative.

The Uniontown (Pa.) *News Standard* of May 21 gave an extended account of a dinner at the Summit Hotel in that city on May 20, at which J. K. Dimmick of Philadelphia and his associates were the hosts and a large number of Connellsville coke operators were the guests. O. W. Kennedy presided as toastmaster. The arrangements were made by Wiley L. Byers, the local representative of J. K. Dimmick & Co., the firm being further represented on the occasion by Mr. Dimmick, M. R. Ganoe, S. A. Carson, E. R. Mann, Theodore Workman and Mr. Hood, all of Philadelphia.

Albert Broden, general manager of the Temple Iron Company, Reading, Pa., will sail June 9 on a combined business and vacation trip to Sweden. He will be abroad about two months.

E. C. Hazard has resigned as president and director of Hazard, Mudge & Co., dealers in iron and steel scrap, Buffalo, N. Y., and is no longer connected with the company.

W. J. Wallis, general manager of the Youngstown Foundry & Machine Company, Youngstown, Ohio, has been elected president of the recently organized Girard Savings & Banking Company, Girard, Ohio.

William K. Field, at present the head of the Sunday Creek Coal Company, Columbus, Ohio, has been elected president of the Pittsburgh Coal Company, to succeed M. H. Taylor, resigned. Mr. Taylor will retain the office of the chairman of the Board of Directors, which he has held since he became president. George Z. Hosack has resigned as a member of the Board of Directors of the Pittsburgh Coal Company, but will retain his office of first vice-president. William K. Field succeeds him on the board.

J. A. Shay, for several years in charge of the office of the Sligo Iron & Steel Company, Connellsville, Pa., has been promoted to the position of manager of sales, effective June 1, vice Henry F. Gilg, recently resigned.

James A. Beckett, who advanced from journeyman molder to general superintendent of the Walter A. Wood Company, Hoosick Falls, N. Y., between 1871 and 1896, last week announced his retirement from the service of that company. He was made foreman of the gray iron foundry in 1888, and for 14 years has been general superintendent of the plant. He has been a well-known attendant of engineering and foundrymen's association meetings, and has contributed to the literature of such organizations, particularly on cupola practice and the metallurgy of cast iron.

Charles M. Schwab sailed for Europe on the Mauretania Wednesday, June 1.

C. A. Moore of Manning, Maxwell & Moore, New York, returned this week from an extended trip through Europe.

Samuel Chandler has severed his connection as the New York representative of the Belmont Iron Works, and is now with the Lackawanna Steel Company, 2 Rector street, New York.

Obituary

JOHN H. WHITTEMORE, Naugatuck, Conn., died May 28, aged 73 years. Born in Southbury, Conn., at the age of 16 he obtained employment in New York with Shepard & Morgan. When the firm dissolved in 1857 Mr. Whittemore removed to Naugatuck, where he entered the employ of E. C. Tuttle & Co., manufacturers of farm tools. In 1858 he formed a partnership with the late Bronson B. Tuttle and engaged in the malleable iron business. Twelve years later the firm dissolved and a joint stock corporation was organized under the name of the Tuttle & Whittemore Company, which in 1880 became the Naugatuck Malleable Iron Company. The success of this business was the foundation of the large wealth which Mr. Whittemore amassed, and much of which he gave for philanthropic purposes. Other companies for the manufacture of malleable castings were organized in New Britain and Bridgeport, Conn.; Indianapolis, Toledo, Cleveland and Troy, N. Y., in all of which Mr. Whittemore was a director. Later the Western concerns were merged as the National Malleable Castings Company. Mr. Whittemore was active in other industries of the Naugatuck Valley, including the brass business, and also in hardware manufacturing. At the time of his death he was largely interested in banking institutions and was a director of the New York, New Haven & Hartford Railroad. He leaves a widow, a son, Harris Whittemore, president of the Naugatuck Malleable Iron Company, and a daughter.

W. S. CLEAVES, Ripley, Mich., died May 19, aged 59 yars. He was born in Lowell, Mass., and had resided in the copper county since 1860. His father and he purchased the Portage Lake Foundry in 1884 and operated it under the style of S. E. Cleaves & Son. The business grew, the foundry was doubled in capacity, and in 1896 the firm incorporated as the Portage Lake Foundry & Machinery Company, with general offices at Hancock. In 1901 the father died at the age of 74 years and W. S. Cleaves was elected president, holding the office until his death. He leaves a widow and a daughter.

J. FRANK DYE, long well known in the foundry trade as president and treasurer of the Newport Sand Bank Company, Newport, Ky., died at Avondale, Ohio, near Cincinnati, May 19, aged 60 years. His brother, George W. Dye, succeeds him in charge of the business.

Meeting of Chemical Engineers.—The American Institute of Chemical Engineers will hold its second semiannual meeting June 22-24, 1910, at Hotel Clifton, Niagara Falls, Canada. Among the subjects for papers are: "Notes on the Corrosion of Iron and Steel and Its Prevention," by G. W. Thompson; "Changes in Industrial Chemistry Caused by Electricity," by Edward R. Taylor; "Loss in Coal Due to Storage," by A. Bement; "Plant Design," by W. M. Grosvenor, and "Underground Waters for Manufacturing Purposes," by W. M. Booth. The address of President McKenna will be on "The Study of Materials as an Element in a Course of Chemical Engineering." Excursions will be made to the plants of the Lackawanna Steel Company, Buffalo Foundry & Machine Company, Acheson Graphite Company, Hooker Electro-Chemical Company and other industries in the Niagara Falls district.

The Jewel Steel & Malleable Iron Company has been incorporated at Buffalo, N. Y., with a capital of $50,000, and will build an extensive plant in the Black Rock manufacturing district, Buffalo, for the production of high-grade steel and malleable castings. C. Jewel and A. W. Valentine, 172 East street, are incorporators.

New Publications

Metal Spinning. No. 57 of *Machinery's* reference series of pamphlets. Paper cover. Size, 6 x 9 in.; 38 pages; 45 illustrations. Price, 25 cents. Published by The Industrial Press, 49 Lafayette street, New York City.

This treatise is one unit in a comprehensive series of reference books originated by *Machinery* which include an indefinite number of compact units, each one covering one subject thoroughly. Metal spinning is an art that was practically perfected long before press working of metals acquired commercial importance. With the development of the latter, metal spinning declined in the same ratio. As a manufacturing process it has never been entirely superseded for making fine brass, copper and aluminum ornamental hollow ware. The products of metal spinning are used in a great many lines of manufacture; among the examples in common use are chandelier parts, cooking utensils, automobile lamps and many other sheet metal specialties. One of the essential requirements of metal spinning is manual dexterity and skill, and at the best the process is physically hard work. There is scarcely any literature on the subject, so that this pamphlet should be of unusual interest to metal workers and manufacturers in general.

The publication is divided into two chapters, which are reprints of articles recently published in *Machinery*. The first chapter was printed in the December, 1909, number, and deals with the principles of the art. The other chapter covers the tools and methods used, and, in its original form, was printed in the March and April, 1910, issues.

Engineering Construction in Steel and Timber. By William Henry Warren. Second edition. Size 6 x 9 in.; 472 pages, 451 illustrations, 5 plates. Cloth bound. Price $5. Published by Longmans, Green & Co., London and Fourth avenue and Thirtieth street, New York.

This work is one of the standard volumes of Longmans' civil engineering series. The first edition was published in 1894 under the title "Engineering Construction in Iron, Steel and Timber." The development in the science of testing materials during the last 15 years and the substitution of structural steel for wrought iron, together with a new standard for the allowable load in structures subjected to moving train loads has necessitated the entire rewriting of the first two chapters, which deal with stresses and strains, properties of cast iron and steel, the determination of safe loads in structures, and timber. Additional matter has been added in a number of chapters to make the book thoroughly representative of the best modern practice. The parts of the book treating of the strength of columns and riveted joints have been rewritten. The seven chapters dealing with bridges have been revised and in some cases entirely rewritten. Numerous examples of the design and erection of railroad and highway bridges have been worked out and a number of well-known types of these structures built in America are included.

Ornamental Concrete Without Molds. By A. A. Houghton. Bound in cloth. Size, 5 x 7½ in.; 132 pages; 30 figures. Price, $2. Published by the Norman W. Henley Publishing Company, 132 Nassau street, New York City.

This book is a practical treatise explanatory of a system of molding ornamental concrete units with wood and metal templates whereby the concrete worker is enabled to mold or model in concrete any cornice, column, pedestal, base, cap, urn, pier or archivolt in a monolithic form at the place where they are to be used. These may be modeled in units or blocks and then built up in accordance with the requirements of the specifications. Full directions are given for making the templates and there is additional information on the proper preparation of concrete for ornamental work, the proportionate sizes of the various units and the reinforcement of the work; in fact, everything that a concrete worker needs to know to turn out perfect work in any style of ornamental concrete without the purchase of expensive molds is fully explained and illustrated. The book is divided into twenty chapters which deal with the advantages of the system, the construction of the templates, the preparation of the concrete and the use of the templates. These chapters are supplemented by detail drawings giving the proper proportions for the various types and sizes of ornamental concrete work in the different architectural orders and data sheets are appended which give rules for determining the proper sizes of the different parts of these orders. A simple method of fluting and molding columns and building any style of concrete arch is described in two other chapters. In the balance of the book detailed instructions are given for molding any style of concrete monument as well as placing inscriptions on them, how to mold several styles of urns and lawn vases with pedestals, ornamental hitching posts, grave markers, fountains, caps, garden furniture, flower pots and many other forms of ornamental concrete. Illustrated directions are given for making and placing the reinforcement required by these forms.

"Fires: Effects on Building Material and Permanent Elimination," is the title of a 20-page pamphlet by Frank B. Gilbreth, 60 Broadway, New York City, reprinted from the *Bulletin* of the American Society of Mechanical Engineers. The title fully sets forth the character of the treatise. Numerous illustrations of faulty construction are given. The author presents strong arguments for the use of concrete.

The report of the Water Supply Commission of Pennsylvania for 1908 has been received through the courtesy of John Birkinbine, chairman. The work comprises 110 pages and is divided into five chapters and an appendix. Two exceedingly interesting chapters are those relating to droughts. The commission made a more thorough study of rainfall, stream flow and water supply conditions during the drought period of 1908 than had previously been done. The data collected indicate that seldom if ever had Pennsylvania in general been subjected to more serious drought conditions. The inference is derived that the normal precipitation in some parts of Pennsylvania is little more than sufficient for the requirements. A given deficiency in the precipitation is to-day of more importance than formerly, for the consumption for domestic and industrial purposes is increasing rapidly, while at the same time the proportion of run-off to rainfall tends in many parts of the State to decrease yearly, owing probably to changed watershed conditions; so that the available balance between consumption and supply is growing less, and, in the case of some watersheds, has become exhausted. It is observed that to meet these conditions it will be necessary either to restrict the use of water, control its waste or to store it in wet seasons for use when the stream flow depreciates.

Gredag is the trade name adopted by the International Acheson Graphite Company, Niagara Falls, N. Y., for its graphite grease, in order that it may be distinguished from grease products which contain impure natural graphite. The graphite blended with a high-grade grease in Gredag is an electric furnace product, hence the purest that can be made. In Gredag are combined all the merits of both graphite and grease, the combination making a lubricant of high quality and value.

The National Machine Tool Builders

The Meeting at Rochester, N. Y., May 24 and 25

The convention of the National Machine Tool Builders' Association at Rochester, N. Y., was as interesting and enjoyable as the opening sessions promised. Seldom does a trade gathering listen to so much that is of importance bearing upon its policies and its welfare. Such topics as "The Future of the Automobile Business With Reference to Machine Tools," "The Cancellation of Orders," "Cone Drive *versus* Gear Drive," and "Apprenticeship" were handled from practical points of view by men thoroughly versed in their subjects.

E. J. Kearney, Kearney & Trecker Company, Milwaukee, sent a communication urging the members to figure their costs on the basis laid down in the published report of the Committee on Costs. W. R. Wood, Cincinnati, an attorney who has been conspicuous in patent litigation affecting the machine tool industry, read an instructive paper entitled "A Bill to Create a Patent Court of Appeals." Very great interest was manifested during an address illustrated by lantern slides by Prof. F. B. Davis, Superintendent of Schools, Cincinnati, on the "Cincinnati Continuation School." Another noteworthy feature of the convention consisted of addresses on "Direct Advertising," by A. H. Hitchcock, publisher of *Hitchcock's List*, and "Trade Paper Advertising," by John A. Hill, publisher of the *American Machinist*.

New members, in addition to those named in *The Iron Age* last week, are as follows: Superior Machine Tool Company, Kokomo, Ind.; Ohio Machine Tool Company, Canton, Ohio; Rochester Boring Machine Company, and Charles Bridgeford Machine Tool Company, Rochester, N. Y.

On motion of Murray E. Shipley, Miss Kate Gleason was elected an honorary member of the association.

J. B. Doan, American Tool Works Company, Cincinnati, in a report for the Tariff Committee, reviewed the present tariff situation, including the proposed commission. Interesting data were given, as including in this paragraph:

> At the present time the only countries exacting in whole or in part their higher schedule of duties on products of the United States are France, Canada, Haiti and Salvador, and machine tools do not come under these headings in the French import tariff. Canada gives to Great Britain a preferential duty on machine tools, the same being 15 per cent., as against 27½ per cent. on imports from the United States. Cuba and Brazil admit imports from the United States at lower rates of duty than those prescribed for imports from other countries.
>
> As an example of the varying import duties upon machine tools when shipped into some of the leading countries, I quote the following approximate figures, applying to the shipment of a 14 or 16 in. lathe, weighing approximately 1800 lb.:

Into—	United States currency.
Germany	$15.61
France	38.02
Denmark	24.10
Austria-Hungary	40.00
Italy	14.28
Russia	107.84

On recommendation of the Committee on Resolutions, the association passed a resolution of friendship and appreciation for W. P. Davis, Rochester, whose illness prevented him from attending the convention for which he had labored so energetically. Other resolutions adopted were for the appointment of a committee to revise the constitution, a committee to work with the Supply and Machinery associations in investigating the subject of the cancellation of orders, and a committee to investigate thoroughly the cost of selling machine tools, with authority to confer with a committee of the dealers.

The dinner given by Miss Kate Gleason of the Gleason Works, at her beautiful villa, constituted an occasion which will long be remembered by her nearly 200 guests. The villa is of Spanish architecture of the Moorish period, a motif which is carried out with painstaking detail but at the same time coupled with much originality.

Secretary Charles E. Hildreth received many congratulations upon the great increase of membership achieved through his efforts, and for the illuminated programme and its valuable details of information.

Apprenticeship*

Gould & Eberhardt's System—The Holding Back of Wages—Pertinent Suggestions

BY FRED L. EBERHARDT.

With the necessary requisites in mind we select applicants for apprenticeship from our public grammar and high schools by applying to the superintendent of public schools and his principals; also our Newark Technical School, Municipal Labor Bureau, and by advertising in the daily papers, alternating our advertisements by first appealing to the boys themselves and second to the parents, approaching the latter from the standpoint they should not overlook their responsibility in considering their sons' future welfare and earning power. Too many parents look only at the present and think, because their boys can earn $6, $7, $8, or $9 per week, that it is helping them better than to put the boys out at lower wages, and no doubt there is is a good deal of truth to this contention. But, if the boy is made of the proper mettle and has the natural ability, he would be destined for far greater results in a few years than if he had not started on a trade at all. We would lay great stress on the need of educating parents to allow their boys who have a mechanical inclination to serve an apprenticeship of say, four years, in a well-regulated factory. While not making it obligatory, we strongly advocate our apprentices attending the Newark Evening Technical School, of which a number of our apprentices have been graduated.

At present we have about 65 apprentices, all bound and indentured according to the apprenticeship laws of New Jersey, and have none who are not bound in this manner.

Details of the Methods Followed

We have practically two forms of apprenticeship, one for young men about 17 years of age, embracing what we term our regular course and covering a period of four years of 10,800 hours, and another for two years, or 5400 hours, called our "one-branch," and intended for young men 21 years and older. Reckoning a year at 2700 hours, in the case of our four-year course we have a first period of 2000 hours at 8 cents per hour, a second 2000 hours at 9 cents, a third 2000 hours at 10 cents, a fourth 2000 hours at 11 cents and a fifth 2800 hours at 12 cents. This makes a total of 10,800 hours.

The total hours in each period are required to be completed before the next advance in pay is made. We require that the apprentices' parents shall pay us $1 per week during the first four periods, which amount forms the collateral for a bond, which the father or guardian is required to execute. This amount is returned at the expiration of the term, if the said term is completed in a satisfactory manner. However, if for any reason the terms of the papers are violated or the young man runs away, the money paid on account is forfeited. Incidentally, I would say that the amount which we pay the young man, as above, is larger than what it was formerly. We made it sufficiently more for the purpose of enabling the parent to pay back the

* Read before the convention of the National Machine Tool Builders' Association, Rochester, N. Y., May 25, 1910. Mr. Eberhardt is a member of the firm of Gould & Eberhardt, Newark, N. J.

$1 per week to make good the bond. In this way, we feel, we make it more feasible for a worthy young man, so to say, to pay his own way so far as securing a bondsman is concerned, a collateral bond always having been one of our requirements.

The First Form of Apprenticeship

The regular apprenticeship, as above, includes an opportunity for work at the vise, lathe and planer. In addition, milling machine and gear cutting machine experience, also other work, is afforded to those boys who show ability to absorb.

Our experience has taught us that there is so great a variation in capacity that wherever we see a boy shows ability we do not hesitate to advance him, and when we find a boy who does not possess the ability we strongly advise him and his parents to have him take up some other line of work. This we do within the first 4000 hours of service. It does not always take 4000 hours to determine this, but there are times when, before taking summary dismissal measures, we try out a boy at more than one branch or place him with different foremen, so that, in the final disposition of the case, neither the parent nor the boy can say that he was not given a fair trial. For all these efforts expended on the boy up to this time, should he prove deficient and be dismissed, we require that whatever money has been paid on account of the bond be forfeited. This is, in a measure, to partly compensate us for the time spent, work spoiled, &c., in giving the boy a chance to demonstrate, in our opinion or judgment, whether or not he was suited for the trade. The necessity for this measure does not occur often, but we feel that it is absolutely necessary to have some such method of procedure.

The Second Form ot Apprenticeship

Our second form of apprenticeship, called our one-branch, is for young men who, having attained their majority, realize the necessity for learning some trade and regret not having been given the opportunity in earlier years. This apprenticeship, as stated, is for two years, or 5400 hours, divided into two periods of 2700 hours each, the first at 12 cents per hour and the second at 14 cents per hour. We require the young men themselves to pay us $1 per week, the same as before explained. This amounts to about $165 in the four-year course and $130 in the two-year course, and in each case is paid back at the expiration of the term when completed in a satisfactory manner. This latter amount is also subject to the same penalties as previously mentioned.

In both forms of apprenticeship we aim to teach the finer parts and points wherever the young men show the ability to take on and grasp the same.

At the present time we have seven in our drafting room. Our chief draftsman and three journeymen draftsmen were our own apprentices at the machinist's trade. Another is an apprentice at the machinist's trade, and has been given drawing room privileges and practice. One of the journeymen draftsmen is foreign born and a trained technical graduate. We do not include instruction in the foundry or pattern shop generally, although all of the apprentices who gain drawing room experience have access to and come in contact with the work in the patternshop and foundry. For the foundry and patternshop we have similar but special and separate courses.

All of our apprentices during their apprenticeship are furnished with the necessary tools required in the several branches, and we pass free title to them upon the apprentice completing his term.

In closing, I have a suggestion that I think it would be well for each one of us to consider as we go to our several cities, something that would effect and accomplish some good for the benefit of all the manufacturers of this country. If the city, county and State can devote thousands and in some cases millions of dollars in the erection and maintenance of reformatories, jails, penitentiaries and State prisons for an attempt to correct and punish those who are disposed to evil or easily tempted, why would it not be a good investment to provide or set aside a small fraction of this sum for the encouragement and benefit of those better disposed and anxious for technical training? The writer thinks it would be a great step in advance for communities and the people, if all the States would make an effort to encourage and provide free facilities with the proper restrictions and control for those anxious to learn good trades, and believes that such a campaign, if rightly directed, would in the end tend to reduce the ever increasing expense of the criminal and those viciously disposed. Why not spend a little money before the harm has been done, and thus avoid or reduce the expense and damage incurred later by the illiterate and uneducated masses?

Standard Allowable Bar Variations

Allowable Variations in Size and Weight of Hot Rolled Bars

The Association of Steel Manufacturers has prepared for general distribution its schedules of standard allowable variations in the size of hot-rolled bars and in the weights of "bar sizes" of angles and similar shapes. It is expected that the determination of these standard rolling tolerances will be deemed an important matter by a large number of manufacturers and consumers of rolled bars. The specifications, copies of which, in pamphlet form, can be procured from the secretary of the association, Jesse J. Shuman, care Jones & Laughlin Steel Company, Pittsburgh, Pa., are as follows:

For bar sizes of angles, tees, zees and channels the following average variations in weight will be permitted for sections of the various dimensions and thicknesses stated:

Dimensions.	Thickness. Inches.	Variation in weight. Per cent.
Any dimension over 1½ inches	Over 3/16	4 over and under
All dimensions 1½ inches and less	Over 3/16	5 over and under
Any dimension over 1½ inches	3/16 and less	6 over and under
All dimensions 1½ inches and less	3/16 and less	7 over and under

Note.—A channel is in "bar" size when its greatest dimension is less than 3 in. An angle, tee or zee is in "bar" size when its greatest dimension is less than 3 in.; or when it is 3 in. or more and at the same time the thickness is less than ¼ in.

The standard allowable variations in the size of hot-rolled bars are as follows:

Rounds, Squares, Hexagons.

	Variation in size. Inch.	
	Under.	Over.
Up to and including ½ in.	0.007	0.007
Over ½ in., up to and including 1 in.	0.010	0.010
Over 1 in., up to and including 2 in.	1/64	1/32
Over 2 in., up to and including 3 in.	1/32	3/64
Over 3 in., up to and including 5 in.	1/32	3/32
Over 5 in., up to and including 8 in.	1/16	1/8

Flats.

	Variation in width, inches.		Variation in thickness, under and over. Thickness of flats, inches.			
Width of flats.	Under	Over	3/16 and under	Over 3/16 up to ½	Over ½ up to 1	Over 1 up to 2
Up to and including 1 in.	1/64	1/32	0.006	0.008	0.010	..
Over 1 in. up to and including 2 in.	1/32	3/64	0.008	0.012	0.015	1/32
Over 2 in. up to and including 4 in.	3/64	1/16	0.010	0.015	0.020	1/32
Over 4 in. up to and including 6 in.	1/16	3/32	0.010	0.015	0.020	1/32

No. 1 furnace of the Warwick Iron & Steel Company, Pottstown, Pa., was blown out May 24 for general repairs, the completion of which will require several months. No. 2 furnace, the largest of the group of three, continues in blast.

Cone Drive versus Gear Drive

A Discussion by William Lodge and R. K. Le Blond

A very interesting feature of the proceedings at the meeting of the National Machine Tool Builders' Association at Rochester, N. Y., last week, was a discussion of cone and gear drives by William Lodge of the Lodge & Shipley Machine Tool Company and R. K. Le Blond of the R. K. Le Blond Machine Company, both of Cincinnati.

William Lodge's Paper

The cone drive, as we all know perfectly well, was made originally to give a variety of speeds. Because of the variety of speeds needed, a long length of cone pulley was required. Necessarily, the width of the belt was cut down because to make a cone pulley with a belt of sufficient width to give great power would not only make it difficult to shift from one speed to another, but would increase the length of the lathe head to undue proportions. This always limited the amount of power that could be obtained through the belt, particularly when driving without the gears. This design, however, seems to have served the purpose for which it was originally made up to the time of the advent of high-speed steels and of the change in architecture of buildings for machine shops.

THE HIGH CEILINGS OF MODERN MACHINE SHOP BUILDINGS.

The modern machine shop building has a very much higher ceiling, which increases the difficulty of manipulating the belt from one step to another of the cone pulley.

The cutting of metal at high rates of speed has called for a new design, increasing the power anywhere from two to five times, hence the need for the gear drive and the single belt. This does not by any means eliminate the cone pulley, because of the fact that a great deal of work is of a very light character, where the cone pulley can be used to good advantage, but it does bring us face to face with the problem of how we ought best to meet the condition brought about by the change in architecture of machine shop buildings.

Without discussing how much of a figure the electrical drive may cut in the present requirements, and confining ourselves solely to the best method of meeting the changed conditions in architecture, and looking to the fact that we generally leave the whole problem of how to mount the countershaft and shift the belt to the user, I conclude it might be well to call the attention of the members of our association to the necessity of providing countershafts that are driven by cone pulley to be either a part of the lathe or else suitable drop brackets from the ceiling that will permit the length of the belt to operate about the same as in the old days, when ceilings were 10 and 12 ft. high. This will not only save the maker inconvenience as well as annoyance for the user, but will permit the cone pulley to continue its very useful functions where that style of drive is all-sufficient to take care of the work in hand.

A suggestion at this point may be in order in looking toward the belt having a permanent joint or being made what is known as an endless belt, and then an easy method applied to the countershaft of raising the journal bearings sufficiently to keep the belt taut.

As most of you know, a great many belts are spoiled because of lack of care or lack of knowledge in the sewing of them; the moment a belt sewed by the old method becomes a little freer on one side of the sewing than on the other, it makes the belt longer on that side and causes it to twist, which, in a very short time, destroys the belt. If an easy method of releasing the belt from being tight until it is shifted and then the same easy method applied for tightening it again, a great deal of trouble we have heretofore encountered will be done away with. If American manufacturers do not do this surely some of the foreign manufacturers will and we shall be apt to lose out in the race on competition.

THE QUESTION OF POWER.

I have noticed in my experience that the tendency on the part of the seller of our line of product is to talk high power and to persuade the customer into buying more power than is needed for the work in hand. I call to mind some time ago being asked by the maker to give an opinion as to one of these high power machines, a lathe of 16-in. swing and the power provided permitting a cut 1 in. in depth with a good, strong feed. I said: "Suppose you were buying lathes for your own shop to do your own work and were equipping a new shop, how many of this particular type of lathe would you put into commission?" He answered promptly, "a very few." "Then," said I. "does this not tell the story very clearly that a large number of the lathes do not need to be geared for tremendous power and is there not room for lathes of a much lighter character for the work of that type?"

There is also another point of objection to the all-geared drive, namely, that in course of time, after the gears have worn from their nicety of fit, they are apt to show the marks of the gears on the work. Consequently, if the party using such a lathe is not equipped with the modern grinder he will have a piece of work that is not round although it apparently may be smooth after it has been filed, so that care should be taken with the salesman as to his recommending high power machines where fine finish is required.

It may be that lathe manufacturers are not as thoroughly well up on gearing as men who make planers because, as we all know, the planer will continue to do smooth work even after the gears are worn, and if any of our members have knowledge that will be of benefit to the rest of the members looking toward delivering absolutely smooth work through gears on lathes it will open up a field for discussion that will be somewhat interesting.

The object of this paper, so far as the writer is concerned, is to direct the attention of the membership to making the very best article for performing the work wanted and toward securing to the membership of the National Machine Tool Builders' Association of the United States all the trade that is possible to be obtained purely because we are furnishing the best article for the work in hand, no matter of what nature.

R. K. Le Blond's Paper

Theoretically, the geared head drive has the most advantages, and the present development is along the geared head lines, but practically, and commercially, the cone driven machine is more than holding its own, and as we gather our costly experience from miscellaneous experiments on gear driven machines we discover that the old reliable cone drive is still to be an important factor in machine tool design.

WHAT ORIGINATED THE DEMAND FOR GEAR DRIVE.

We all realize that the demand for the gear drive originated with the advent of high speed steel; in other words, when the cutting tools were perfected to such an extent that they could stand the speeds, and the heat generated by these speeds, the old style cone drives were found lacking in power, and some of the manufacturers immediately decided upon a method of gearing to increase the power. This, in my judgment, was a temporary and poor remedy, and a very costly remedy to the manufacturer; because, while I am loathe to say it, very few of the lighter class of machine tools were scientifically designed, and this gear drive was begun more or less on a hit-and-miss plan.

In looking over the various gear drives that have been produced in the last few years, we are naturally surprised at the varied mechanisms employed; at the ignorance displayed in the selection of metals, the pitches of gears, the size and material of shafts, the oiling facilities, &c. While this is a defect in individual construction and not a fundamental defect of the geared head, it all goes to show that the development has been more or less experimental and extends through the complete range of frictions, tumbling gears, sliding gears, *a la* automobile, &c.

Now, as a matter of fact, all the advantages that can possibly be claimed for the geared head machine can be obtained better with a variable speed motor and comparatively few mechanical changes. This is owing to the fact that the electrical changes can be obtained with a much smaller friction loss—that is, more efficiently; that the change increments are much closer; that the speeds can always be obtained while the machine is in motion, not necessitating stopping for changes, doing away with the counter, &c. In other words, the motor drive is the ideal geared head machine.

THE DEFECTS IN ALL GEARED MACHINES.

The greatest defects in the all geared machines are lack of efficiency, expense of maintenance, and increased first cost. This holds true regardless of the fact of the changes being made in one unit or distributed in two and one placed on the ceiling. We will take these comparisons up separately.

First, efficiency of the geared machine. In extreme cases but 40 per cent. of the power applied to the machine is delivered to the cutting tool or spindle. In the case of feeds, as shown by Mr. DeLeeuw's experiments, the friction on the shafts and gears has reduced this to as low as 2 per cent., and, under the very best conditions, 20 per cent., of the power applied. Of course, this is an extreme case and is due primarily to the fact that the reduction is so great and the power had to pass through a screw, which, as we all know, is a very inefficient method of power transmission. But in the construction of various designs of geared head machines, we see the worm and worm wheel and bevel gear, as well as spur gear.

I was recently visiting a large machine tool plant. In going through the shop with the superintendent, we stopped at their single pulley drive 16-in. lathe. While we were standing there, an office boy brought a copy of an order for one of these machines on which the purchaser wished to apply a one horsepower motor. The superintendent immediately said this was impossible, saying it took more than one horsepower to turn the machine over empty. This was a friction construction. At the same time, under the old belting conditions, tests made on these lathes by different authorities resulted in establishing the power consumption of one-half horsepower under actual working conditions.

In comparison with this, take the old fashioned cone. On the direct speeds, or open belt speeds, we could obtain an efficiency of as high as 95 per cent., and the extreme cases of transmitting power through the back gear very seldom went lower than 75 per cent. This difference in efficiency has to be taken up by the machine itself; in other words, it is a destructive element. It means friction on the journals, friction on the gears, heat generated to be taken up by the body of the machine, and wear in general, from all of which the user obtains no benefit and which goes into the maintenance charge.

Of course, it is a very easy matter for the exponents of the geared drive to say that the power factor in machining costs is so slight that it is not to be considered. This is true to a great extent, but when you analyze it, you will find it is not simply the difference in the coal bill.

As an instance of this, John Becker, in conversation with me, stated that a production man, in one of the largest plants in the East, had formerly purchased all all-geared machines. At that time he was simply serving the concern in the capacity of equipment purchasing agent. His position was changed later, and he was given charge of not only purchasing the tools but their maintenance, whereupon, after thorough investigation, he quit purchasing geared head machines and purchased nothing but cone driven machines, stating to Mr. Becker that he found the maintenance of the geared head machines outweighed and outclassed the advantages of the facility of the speeds, the increased driving power and all other claims made for the tools.

INCREASED MAINTENANCE COST OF ALL GEARED MACHINES.

I think you will find, if you will investigate carefully your overhead charges, the increased cost of the geared head machines, added to the increased maintenance cost, added to your increased power cost, will more than outweigh all the advantages claimed by exponents of the all-geared machines.

I would like to say a few words about speed changes. The advocates of the geared machines always harp upon the advantages of instantaneous speed changes. Now as a matter of fact, one of the best known makers in this country places a plate on his machine on which it is stated positively that the machine must be stopped when changing speeds. Another has to throw in and out back gears when making the change of speeds, which necessitates the stopping of the machine. The only instantaneously changed machines are the friction changes, which are always more or less a cause of annoyance and trouble.

Another claim made for this type of machine, which is lived up to in a very few cases, is the fact that the machines can be driven direct from the line shaft and require no countershaft or overhead works. This is more of a theoretical than a practical advantage, as nine out of ten times the machine has to be placed so that it requires a special jack shaft, and I have always found it the best plan, when machinery is idle, to stop it as close to the line shaft as possible, and not have moving parts on the machine.

THE DOUBLE FRICTION BACK GEARED CONE.

Now for the "old reliable" cone drive. When I say "old reliable" I do not mean the old fashioned cone which was small in diameter and narrow face. I mean, as I stated in the original proposition, the double friction back geared cone, which can be made of large diameter and proper face, the two ratios of back gearing enabling a cone to be designed so that the old small step is entirely eliminated. With this type of drive, you can deliver to your spindle twice the power you can with the same size of pulley on a geared drive.

While I realize that the geared drive can be constructed so that the size and speed of the pulley are practically limitless, the fact remains that all the designs on the market to-day are fairly well within the range of the modern cone sizes, used on similar machines. Further than this, there is no limit to the power that can be obtained by the cone drive. The

Alfred Herbert Company of Coventry has demonstrated this in some of its new design machines which use the cone, running at a very high speed, as a driver, and use the double back gear, never using the direct cone speeds. Of course this construction is simply a development of the old style drive which we are familiar with on Lincoln type millers and machines of this description, but this combination of the cone drive will give more power than is required by any machine in the market to-day, and will give it with less friction loss; in other words, with greater efficiency than any geared head machine on the market.

As far as the belt shifting feature goes, on the cone driven machine this can be easily eliminated with a belt shifting device, and is eliminated without this device, by the operator, where the belts are of moderate width and length. The operator does not have to stop the machine to make the changes and practically performs an instantaneous speed change. The ideal drive to-day is large cone diameters and not overly wide belts.

PLANERS TAKEN AS AN EXAMPLE.

As an example of the drift of actual practice in this line, I would like to cite planers. In our shop we have used four different designs of geared speed devices on our planers, all of which have been uniformly unsatisfactory. We have recently noticed that a prominent planer maker has "dropped" to this condition and is going back to a cone for his cutting changes. There is also one of the best planer makers in the United States who has always used a cone variator. We also know a prominent boring mill manufacturer who has found the most practical way to obtain speed changes in through a cone.

Now in these instances it is not a question of original cone design; it has been a development where the cone has actually been found to be the most satisfactory method of obtaining these speed changes. This has also been exemplified in feeds. For instance, take grinding machines. Brown & Sharpe and Norton are both using cone belts on their feed changes, after both have experimented and got out different forms of gear changes.

Now about the canard of the belt pull on the spindle. With the geared head machines, of course there is no belt pull on the spindle, but there is the gear pressure, which, in slow speeds, is multiplied a great many times and is considerably more than the belt pull. Further than this, on a cone driven machine the belt pull is not a detriment but a possible advantage. It simply serves to counterbalance the weight of the moving parts, namely, the cone and spindle.

In my machine tool experience, I have never heard of a lathe spindle wearing upward. We know positively from our experience with second hand lathes that the spindles are invariably lower than the tailstocks, so this would demonstrate thoroughly that the wear of the spindle is downward in spite of the belt pull.

It is an indisputable fact that in 99 machines out of every 100 the cone drive is capable of furnishing much greater power than is required for the machine as operated; that is, the machines of to-day are not worked to 50 per cent. of their pulling capacity. If they were worked to capacity, it would be a mighty bad thing for the machine tool builders, and would be the means of calling a great many bluffs, as we all realize that there are a great many guarantees made with the absolute knowledge that the machines cannot stand up to the work continuously, and after the first trial there will be no attempt to continue production on the same scale, which simply proves that the excessive pulling power in 99 cases out of a 100 is not a legitimate requirement, as the purpose of machining to-day is not to make shavings but to do accurate work.

I maintain that you cannot get as good average production with a geared machine as you can with a cone driven machine. I realize that on certain jobs a saving in time might be shown on a geared machine, but if two shops, one equipped with double friction back geared cone machines and the other with all geared head machines, both under equally efficient management, were taken as an example, the cone drive shop would produce more work or produce the same work at a much less cost.

To sum this matter up, we arrive at the following conclusions: That the advantages claimed for the all geared machines have not been obtained, as there is not a single all geared machine on the market to-day where you can get instantaneous speed changes, or the required number of speed changes without a multiplicity of frictions; there is not a geared machine on the market in which you can get the same proportionate efficiency; there is not a geared machine on the market in which the maintenance charge will not be greater than the cone head machine; there is not a geared machine on the market which can be produced for anything like the same first cost.

For the cone driven machines, we find you can get a bigger proportion of speed changes than is permitted by the geared head designs; you can get, and do get, practically the same power at the cutting tool; you eliminate vibration and excessive wear and you get a cheaper first cost machine. In other words, you have an indisputable proposition that, for general speed changes, there is nothing as cheap to manufacture or as efficient as the cone pulley.

The Empire Iron & Steel Company Reorganized

The formal transfer of the property and business of the Empire Iron & Steel Company and the Sheet Metal Mfg. Company, Niles, Ohio, to the Garry Iron & Steel Company, has taken place, and the two companies first mentioned have reorganized by electing the following named officers and directors:

Empire Company: President, George D. Wick; vice-president and general manager, Samuel Siddall; treasurer and manager of sales, Jacob D. Waddell; secretary and assistant manager of sales, P. H. Hubbard; assistant treasurer, Philip Wick; assistant secretary, D. W. Kerr. Directors: George D. Wick, Samuel Siddall, Philip Wick, W. T. Hardesty and Jacob D. Waddell.

The Sheet Steel Mfg. Company: President, Samuel Siddall; vice-president, Jacob D. Waddell; treasurer, Philip Wick; secretary, J. Charles Wicks. In addition to the four officers, P. H. Hubbard was elected a director.

Messrs. Hardesty, Waddell, Hubbard and Kerr were associated with Jonathan Warner in the two companies at Niles, Mr. Hardesty being superintendent of the plant. The rolling mill, which is now practically new and is larger and more complete than ever before, has resumed operations in full, with enough orders already entered to insure a steady run for some time.

The Garry Iron & Steel Company's headquarters will be removed from Cleveland to Niles about July 1, but will be conducted separately from the Empire Iron & Steel Company.

The Reliance Electric & Engineering Company, formerly the Lincoln Motor Works Company, Cleveland, Ohio, announces that hereafter its armature shifting type of variable speed motor will be known as the Reliance adjustable speed motor instead of the Lincoln variable speed motor, as formerly. This change is made necessary to describe better this type of motor in accordance with present standard terms adopted by the American Association of Electric Motor Manufacturers, and also to avoid confusion with the Lincoln Electric Company of Cleveland.

The Cancellation of Orders

C. Wood Walter, Murray E. Shipley and William H. Reid Present a Comprehensive Discussion of a Most Important Topic

Much value is attached to the following papers presented at last week's convention at Rochester N. Y., of the National Machine Tool Builders' Association by C. Wood Walter, Cincinnati Milling Machine Company; Murray E. Shipley, Lodge & Shipley Machine Tool Company, and William H. Reid, Marshall & Huschart Machinery Company. C. A. Johnson, Gisholt Machine Tool Company, who was the fourth programme speaker on the subject, went into the matter but briefly, as his company has an unbreakable rule that the buyer shall not cancel a contract.

C. Wood Walter's Paper

There is no force so potent in the manufacturer's daily "struggle for existence" as the machine tool order. He is all smiles on a "big order day," full of optimism after a "big order month," and ready to enlarge his plant, increase his force and bring out a new line after a "big order year"—all of which would be good judgment if orders always turned into shipments, but there are times when they do not. It does not take a long memory to go back to the fall of 1907, when orders vanished from our books like a beautiful dream, and (to quote the immortal bard) "like an unsubstantial pageant faded into thin air." Our fat order books shrank into nothingness almost over night, and instead of being six months behind on orders—as we were wont to boast—most of us, in about 60 days, got six months ahead. As a result we were obliged to cut down the working force and increase the costs, thereby cutting out profits. This deplorable condition was due to the fact that the demand fell off, but it was also largely due to the fact that many of the orders on our books were not contracts but simply guesses as to what the buyers thought they might need.

TWO CLASSES OF ORDERS

There are two classes of orders, so-called, in the machine tool business:

1. Orders from the machine tool dealers for stock. This kind of order when not limited does not have a high degree of validity—and perhaps necessarily so—for no manufacturer should force his agent to take stock when the agent's sales do not justify his previous estimate. In so doing we are simply using the agent's money, thereby crippling our selling department and increasing the costs of marketing our goods. The agent's stock order is not economic; stocks can be more economically and more intelligently carried and maintained by the manufacturer at one central point in his warehouse than by his agents in their expensive stores at various points. This is not inconsistent with the policy of carrying a proper line of sample machines on the agents' floors. An agent's stock orders, for the most part, serve only to record his judgment as to what the future demand may be in his territory. Many manufacturers therefore no longer accept agents' stock orders. Where they are accepted, it should be for limited quantities only and made not subject to cancellation.

2. The order of the second class is the order from the actual purchaser, the user of the machines, placed with the dealer or with the manufacturer direct. Many manufacturers are coming to regard this as the only order that is truly significant. But even this order, as commonly understood, falls short of being an actual contract. A large percentage to-day of machine tool buyers place their orders with the mental reservation that they can easily meet a change in their plans, or a change in the market demand, by a cancellation of the order any time prior to shipment date. To some extent this cancellation privilege has been written into the order with the sanction of the dealer or against his protest. To some extent the dealer has encouraged the buyer to reserve machines subject to cancellation, and such reservations have been turned in as orders to the manufacturer, who forthwith proceeds to invest his money to fill "the large orders on his books." I do not speak of the cancellation based on failure to deliver or on any other legitimate grounds.

Now it does seem that the machine tool order, as it exists to-day, might most profitably be subjected to a reform, so that it shall represent a contract not subject to cancellation, the option of granting a cancellation to rest entirely with the vendor. The time to work this reform is now, while the demand is strong, with no anticipated decline in sight. Consider what an added stability would be given to our industry to-day if the unfilled orders on our books represented actual contracts not subject to cancellation! Consider what a change such a condition of our order books would have made in the fall of 1907, when the slump struck us—and yet this is just what an order means in many other lines of business. Why not in our line?

EVIL RESULTS OF NONBINDING CONTRACTS.

Let us review a few of the evil results that follow from the present practice of filling up our books with so-called orders which do not represent binding contracts:

1. The manufacturer invests his money in materials and wages to finish machines on order, only to find, when they are finished, that he may not have orders for them.

2. The manufacturer increases his production schedule to keep pace with his big order book. When his order book suddenly collapses under wholesale cancellations he is left with a big stock on hand and coming out, with consequent heavy interest charges and often with heavy contracts for materials which he himself cannot cancel. This situation forces him to immediately curtail and run on a losing basis. It is bad enough to suddenly strike a market where new orders are scarce, without having to face a wholesale disappearance of the old orders.

3. Manufacturing on the basis of an artificial demand (as reflected in an artificially padded order book) makes also an artificial demand for material and labor, and a consequent increase in their cost. This is equally true for the dealer, who pays out his money to sell the goods, and increases his salesman's wages because the salesman is piling up big sales, which finally may largely disappear under cancellations.

4. Most disastrous of all, these wholesale cancellations under a slump in the demand leave the manufacturers with such an overproduction on hand that the stability of prices is immediately and most seriously threatened. It becomes a matter of self-preservation for the weaker concern. It is a matter of the greatest possible credit to this organization that a disastrous and demoralizing break in prices did not follow the wholesale cancellation of orders and cessation of buying in the fall of 1907. This was prevented largely through the educational propaganda carried on by this

association among its members to arouse them to a study of the real cost of the manufacture and sale of machine tools and the right of every manufacturer to a decent profit beyond that cost—if he is to perpetuate himself in the business.

BENEFITS OF A BINDING CONTRACT

But our industry should not be subjected to such a strain as this. Once a demoralizing break in prices of this kind takes place, years will be required to recover. Now, it is the speaker's opinion that we will take a long step in the direction of preventing this possibility if we will cut out the cancellation privilege. Consider some of the benefits which would follow the establishment of the practice which would make a machine tool order not subject to cancellation.

1. The manufacturer may make his contracts for materials, arrange his manufacturing schedule and regulate the growth of his plant, with an actual knowledge of the amount of his product which he has absolutely sold and which will stay sold.

2. The machine tool dealer or agent may proceed with the development of his business, with the definite knowledge that he has earned so much profit based on his sales already made, instead of facing the possibility of a threatened and finally absolute loss when he is confronted with a flood of cancellations.

3. If the manufacturer can regard orders as actual and absolute sales, he can then intelligently and economically govern the amount and variety of stock he shall make, since he may approximately measure the actual and real demand for his various items of product.

4. Under a slump in the demand (which in the beginning is often more or less artificial) the orders remaining on the books, if actual and collectable, may be sufficient in the whole industry to bring about at least a partial resumption of business and restoration of confidence; at least the manufacturer would have time to reorganize his production without the disasters of sudden and drastic curtailment. This same benefit would accrue alike to the dealer.

Why should not a buyer be called upon to fulfill his obligations when once he has placed an order? This is true in most other lines. Why should this not become the practice in our industry? When once this custom has become the general practice, no one will object to it. Possibly 80 per cent. of machine tool sales are made through dealers. Let them agree together as to a simple, uniform contract of sale, or order acceptance blank, and write into it "This order is not subject to cancellation." Let the manufacturers who sell the other 20 per cent. do the same, and soon the custom will become established. This still leaves it possible to mutually agree to a cancellation in exceptional cases.

A PRACTICAL SUGGESTION

Perhaps the simplest manner in which to bring this about is for the different groups of competitors in this association to agree together to notify their agents that, beginning with a certain date, all orders on the manufacturers' books, and all orders to be entered in the future, must be considered "not subject to cancellation." This makes it possible and reasonable for the dealer to insist upon the same conditions from the consumer, and the consumer will find that he is asked to meet a regulation which is only reasonable and economic and which is presented to him by all dealers and manufacturers alike, and will soon yield to it as an established custom of trade and ask in turn the same conditions of those who buy from him.

It may not be always desirable or entirely possible to make a machine tool order absolutely ironclad, but it is certainly most greatly to be desired that it should carry with it the force of a greater legal and moral obligation than it does to-day.

The speaker is a firm believer in the dawn of a better day for the machine tool business, brought about largely through just such discussions as we are having here this week, leading to such a study of economies as shall develop an era of better profits and greater stability. Why not make a machine tool order the equivalent of an actual contract of sale, as a token of that better time to come?

Murray E. Shipley's Paper

If there ever was a case where an ounce of prevention is worth a pound of cure, it lies in preventing the cancellation of orders in distinction from forbidding it. In the speaker's opinion, the first step to be taken is to refuse to enter an order except when the name of the buyer and shipping instructions accompany the order, with two objects in view:

1. To make it difficult, if not impossible, for the merchant or dealer to purchase for future delivery what he may not be able to take and pay for.

2. To keep all of the product unsold to consumers in the hands of the manufacturer, that each and every one of his merchants may have available for a prospective order all machines of the given make that have not been *bona fide* purchased by consumers.

If, in addition to this, there be developed a uniform purchase contract forbidding cancellation which each and every machine tool salesman shall be required to have duly filled and signed by the purchaser before the order will be accepted by his firm, very much will have been accomplished toward eradicating this unfair and dangerous practice from the machine tool business.

The speaker understands that at least one of our members has already accomplished all of this. It goes without saying that if many or all of the machine tool manufacturers insist upon such a plan it can be carried out. It is essential for its success that it shall be thoroughly understood that all who subscribe to it are in absolute earnest, and that when the test comes any merchant or salesman who has taken orders without his customer clearly understanding that he may not cancel his order, will surely be held strictly to the contract and that he alone will be the sufferer.

It is trite to discuss the evils of cancellation. What prompts cancellation of orders is "plunging" on any given product. For the manufacturer, inflated orders create conditions which, if sound and true, would warrant his extension of manufacturing facilities and goods in process of production; but which, when panicky times come, suddenly prove false and dangerous and add to the already alarming conditions brought about by small and diminishing receipt of new business.

What other business tolerates such conditions? Can you name one? Let us have all the light possible on this question and decide now upon some practical plan upon which all may unite.

William H. Reid's Paper

For purposes of brevity I will refer to the ultimate user as the customer, the machine tool merchant as the dealer and the machine tool manufacturer as the builder.

As the question of stock orders from the dealer to the builder does not affect the customer, and is well covered in almost all agency contracts, I will not refer to them any further this moment.

An order, when accepted, is simply an agreement which, according to a good authority on contracts, is "a meeting of two minds in one and the same intention." It is manifest that when a customer gives a dealer an order for machines not in stock, it is intended that the dealer will obligate himself to the builder for the purchase price and that the customer is under no financial obligation to the builder; therefore, when a customer wishes to be relieved from the obligation created by his order, in any manner not specified in his contract, he must necessarily treat with the dealer, with a view of having the conditions modified. All those present are familiar with the fact that customers will cancel orders apparently on some slight pretext, but have you ever made a close study of the real reasons why men seek to rescind their contracts?

THE POSITION OF THE ULTIMATE USER

In many cases there is a lack of sense of obligation on the part of customers who do not consider their unfilled purchase contracts as a part of their indirect liabilities, although they do not hesitate to emphasize and exaggerate the volume of unfilled sales orders on their books when they come to the dealer seeking earlier delivery than that promised on the builder's regular delivery sheet, or for the purpose of artificially boosting their line of credit, either in banking or merchandising circles.

The overzealous customer makes preparations disproportionate to the actual demand, without having an appropriation from the financial department of his institution, setting aside from net liquid assets the purchase price of fixed equipment. The more sanguine the customer is regarding the prospects of his own business, the more likely is he to order more machinery than actually required to execute his orders, relying on the fact that he can cancel his orders before delivery, because it is not difficult to find some excuse why the dealer should accept cancellation. If delivery has not been made in reasonable accordance with the dealer's promise, the customer has a right to cancel his order. If the customer has, for financial reasons, found it necessary to retrench, and the dealer on investigation finds the customer has no strong reserve with which to meet his miscalculations, he will gladly accept cancellation, fearing that if he made delivery he would have an uncollectible account on his books, a feature with which the builder under the present conditions is, as a general rule, not familiar.

DIFFICULT TO LAY DOWN A RIGID RULE

We are all agreed that cancellations are not a good thing and must be discouraged, but I do not believe any fixed rule can be laid down at this time which would cover all cases; but we must pay attention to the signs of the times, for visions of things to be done come a long time before the way of doing them appears clear. Under Roman law a deposit was required on certain contracts, this to be forfeited in case of default, while able present day lawyers insert clauses requiring the payment of liquidated damages in the event of default; but the enforcement of a contract by the employment of legal talent is something all dealers should avoid, for lawyers' fees would soon eat up the gross profit, leaving the dealer with nothing, win or lose.

Some builders have for several years reserved the right to limit the size of stock orders, thus enabling them to distribute their product according to the actual demand. Now, it is quite evident that if these builders resolve to accept no cancellations from the dealers they will defeat the object which they have for several years worked to attain, for if a dealer in one locality should, owing to industrial conditions, be compelled to accept cancellations from his customers and is financially able to carry the surplus stock during a period of depression, he will certainly not relinquish any stock when trade conditions improve and other dealers are compelled to wait on factories for deliveries; which simply means that the builder received his business from the dealer in one locality in advance.

Men in charge of affairs in the machine tool industry see that a change in general purchase conditions is necessary and have been looking for the key to the situation, fully believing that an order should carry with it a greater obligation than is at present in many cases contemplated by the customer. Frequently the dealer imposes unusual conditions of payment upon customers who have been dilatory in making settlements of their accounts and hasty in cancelling unfilled orders. This, at times, results in orders going to competitive dealers; but the machines must eventually be furnished by some member of your association. As actions, not words, determine the sincerity of men in affairs of business, any unfair action of any customer toward any dealer or builder should be reported to protect others in the industry from loss, for there are some who are bad who would like to be good, but don't know just how, and I believe such reports would soon serve as effective teachers. There is nothing new in the idea, for it is practiced in financial circles every day.

The customer who cancels his order when the dealer is not in default belongs to the same class as the one who, by withholding payment of his account beyond the maturity date, uses the dealer's money without paying interest, and is not entitled to the same consideration as the customer who settles his accounts and fulfills his purchase obligations promptly, not asking the dealer to assume a portion of the risk of his business.

However, let us not forget that when a frost results in a million dollar damage to crops in a locality the fact is published in many newspapers and generally exaggerated, but when we have a gentle shower doing many million dollars worth of good nothing whatever is said.

VERY FEW PETTY CLAIMS FOR ALLOWANCES

I can safely say that in the machine tool industry there are less petty claims for defective material, damage in packing, differences in count, breakages in transit and inferior quality than in any other line of business. Your product is a staple one; therefore cancellations, except in cases of special attachments, do not work a great permanent injury unless the price of raw material should drop below the cost of that used in the preparation of your product for customers' orders which are canceled before completion. In some lines of business there is practically no salvage in canceled orders owing to the seasonable nature of the business.

It is the experience of my company that cancellations, after all, are only a very small percentage of the grand total of sales, except during a period of general depression, and while at times these have been discouraging, at no time thus far have they seriously influenced our financial condition.

Builders should scrutinize dealers' orders carefully, paying particular attention to the ultimate destination of tools, and I believe they would find cases where dealers had issued orders for customers who had absolutely no use for the quantity or class of machines ordered for them, but were induced by some salesman to place the order to take care of a possible increase in volume of business, with a tacit understanding that cancellation would be accepted if the customer did not want the tool at delivery time.

Investigation would no doubt bring to light a number of cases during the depression of 1907, where the customer had either a direct or implied understanding with the dealer that cancellation could no doubt be conveniently arranged. Such a practice works a hardship on the builder and on the dealer conducting his affairs on strictly businesslike principles. Sales managers as well as credit managers should examine all customers' orders carefully before acceptance on behalf of the dealer, with a view of eliminating any objectionable features before forwarding an order to the builder. It is not an unusual thing to find some very strong one-sided features in the small type on purchase orders.

Some members of your association have designed and are now using order forms intended to protect the seller under almost all conditions which may arise, and no doubt have had able lawyers examine the forms, but I have not seen one which I could recommend for the general use of my company.

The simplest form of order my company receives is from one of the financially strong and without question a well managed manufacturing concern, and it has never had a dispute with that concern either as to terms of payment, delivery date or breakages in transit.

CONDITIONS SHOULD BE ADJUSTED BETWEEN THE PARTIES.

The condition under which a customer wishes to cancel an order is a matter to be adjusted between the

parties to the contract, and the most satisfactory results will be achieved by a fair discussion of differences and a compromise to fit each individual case. My company found in 1907 that cancellations could sometimes be prevented by modifying the conditions in the original agreement, either by postponing the delivery date and holding the tools in stock for six or seven months or changing the terms of payment to monthly installments so small that even the most impecunious could meet them with reasonable promptitude.

After all the question of cancellation is one the builder will settle, and the dealer will, as a matter of self-preservation, be compelled to sell tools on practically the same basis on which he buys them. If the dealer is too lenient in accepting cancellations from customers which are not allowed by the builder, that fact will soon be reflected by an increase in his stock on hand, and can be substantiated by a visit to his store. But if the builder fixes his policy on a basis of "no stock orders and no cancellations," he must, in justice to the dealer, resolve to have his policy remain the same in dull times as in active times and not approach the dealers for stock orders during periods of depression. By all means aim to establish usages of trade which will be recognized as reasonable by the customer, the dealer and the builder.

The Automobile and Machine Tools

The Future of the Great New Industry and Its Relation to Machine Design

BY ROBERT PIERPONT.

No factor of the machine tool industry to-day is of more vital importance than its relation to the future of the automobile business. The topic was ably discussed before the National Machine Tool Builders' Association last week by Mr. Pierpont, who is works manager of the Olds Motor Works, Detroit. He began with a forceful argument as to the financial and commercial soundness of the automobile trade, which is omitted for lack of space.

There is a wide field for new machine tools in the automobile business of to-day. We are far from being in the position of the superintendent of a large hardware concern of Connecticut, who told me they had cut their piecework prices as low as they thought their men could live comfortably on, and there was no way for them to cheapen their product but in the making of special and automatic machinery. But we cannot refuse to be interested in such machinery, as competition will surely drive us to it, sooner or later, whether we will or not.

Special Machinery

Where we are making such large quantities of automobiles there is a great saving in the use of special machinery, even if used for but one season. The large output of one model helps this, as we could well afford to spend $30,000 to experiment and make the tools for a rear axle if we were making 20,000 cars, as it would mean only $1.50 per car and would save several times that, but on 1000 cars it would be $30 per car.

In regard to special machinery designed for special purposes, it has usually been considered by a salesman a good argument to say that the entire cost of the machine can be saved in one season's business, in comparison with the cost of doing the same operation on a standard machine. I am strongly in favor of special machines which do pay for themselves in this way, provided they are simple and easy to operate and not liable to get out of repair.

We have two extremes of opinion in regard to special machinery. A friend of mine, who formulates the policy of a large automobile concern, keeps selling his old machinery to buy new, as fast as something which he thinks is better comes out; consequently, he does not believe in very much special machinery, as he would not be able to sell it as readily as he does the standard tools. Others go to the other extreme, and will buy special tools for everything as fast as they come out, whether there is much of a saving or not. I hardly think either extreme is the better policy. It seems to me there is a large field for standard machines, somewhat simplified, to be used for special purposes; these to be sold at a cheaper price in quantities, but so built that the full complement of attachments could be added at any time desired. This brings up a point which I wish to emphasize, which is "simplicity."

Simpler Machines Needed

Out in Michigan we do not have all high-class mechanics, but are forced to bring in farmers' boys and even the farmers themselves, during the winter months, and try to make machine men out of them. A great many of the machines which we have are so complicated that it takes a long time for such men to learn to operate them. With the rapid increase of manufacturing and the great demands for machinists, it is almost impossible to get enough competent men to run the machines properly. I think we need simpler machines with fewer feeds and speed changes, rather than machines more complete and complicated. In the ordinary use of machinery it is not necessary to have quick change of gears, as the majority of our men run day after day on the same piece or cut, and in getting out pieces in large numbers it is more advantageous to keep a man doing a certain piece of work as he is apt to do better and make more pieces the longer he is at it. The adjustments of the bearings should be simple and easy to understand and operate. Good foremen are getting scarce, and we need machines which will require but little attention.

Referring again to the gearing of the machines, both for driving and speed changes, I notice that our machine shops are continually getting more noisy, and I think you will all agree that when we want a man to do a really nice job we get him off in some quiet place to work. The noise of gears running and shifting attracts the attention of men from their work, and it takes them a long time to get used to it. Especially is this true of unskilled labor. This is another reason why I would favor a more simple machine, which would also be more quiet in operation.

Still another reason why I am in favor of the special machine for doing the work faster and more accurately is in taking care of repair parts. The time is already here for some of the automobile manufacturers, and will come to all of the large producers when they will not be able to take care of the repair parts for outstanding cars in the regular production machine shops, but will have to make special departments where

these repair parts can be produced. If we have any special machinery used in this year's product but not in next, we can turn this machine over to that repair department and continue to make these pieces at a cheaper cost than could be done on standard machines, which will all go to help the upkeep for the car owners.

The Olds Motor Works has been continuously making automobiles since 1898. That was the day of the little runabouts, some of which can still be seen running, and we realize the importance of the repair department more than some of the concerns who are only one or two seasons old.

I think a wise plan also is, instead of selling old machinery to which all the special tools and fixtures have been fitted, to turn these, too, over to the repair or parts manufacturing department and buy more new and special machinery for equipment for the coming season's cars. I am sure that you will all agree with me in this, as the laying aside of the old machines and buying of new will be fine for the machine tool business. This, as you can see, would not be a hardship for the manufacturer of cars, if he buys the special machines and tools with the knowledge that he will more than save their cost in the season's run.

Motor-Driven Machine Tools

I imagine the question of the direct connected or motor driven machines is receiving considerable attention at your factories. It has always seemed to me that special machinery, or that adapted to doing one thing, was the ideal tool for a direct connected one, as the load will be fairly constant. It very often happens that a special tool will do so much work that it will be necessary to run it only part of the time. If motor driven, it could be shut down for the remaining part of the day without cost.

It does not seem practical to me to equip all standard machines with motors, as on a standard machine the work varies in style, quality and power necessary to accomplish the desired result, as at one time we might be using only 1 hp. and at others 10 to 15, or whatever the capacity of the machine might be. For example, if we took a room of 20 milling machines and equipped them all with 7½ hp. motors, the sum would be 150 hp., whereas very likely the whole room could be run to better advantage with one 50-hp. motor, and we would have the difference in investment between the 20 7½-hp. motors as against one 50 hp.

It is a well-known fact, however, that the friction of the line shaft and belts is greater than the power consumed by the required number of small motors running idle, or the amount of current used to run the motors themselves in excess of the load of the machine.

In the remodeling and moving around, which we have found necessary on account of the growth of our machine departments, we have been compelled to use motor driven machines, as they could be placed in almost any position, and a great many times the room was not suitable for the hanging of shafting. I use the word "compelled" because I do not think any one would lay out a machine shop for the special purpose of making automobile parts with the idea of using all motor driven machines; or, in other words, not have a piece of shafting in the building.

However, here is another example where I would prefer a motor driven machine: We will suppose, in order to get out our output, we have to make 25 pieces of a certain kind in a day. Now, this operation, of whatever kind, uses a regular or standard machine, but the tooling is special, and, although it takes but two and one-half hours to do the operation on the 25 pieces, on account of the difficulty in changing over the machine and the size of the pieces, it is impracticable to do more than that number per day. Now, although this is a standard machine, I should wish it motor driven, as the power used to drive the countershaft, &c., with the wear and tear on belts for the remainder of the day would more than offset the cost of the motor.

The Character of the Drive

I may be mistaken, but I have always thought that the single pulley drive came as a natural result after the motor drive; not from necessity, but just because it was very easy to put a pulley on where the motor was connected.

There are a number of machine tools built which, under certain conditions, can remove an enormous amount of stock, but the jobs are very few on which we can use a machine to the limit of its power. On the great majority of pieces that go to make up an automobile, if we held the piece tight enough to remove the material as fast as the machine will cut it, we would spring the piece all out of shape. If we do not spring it in holding, it will spring when we let it loose. I have seldom seen in actual use a cone driven machine which would not do the work as fast as the piece or fixture would allow it to be done. As the single or geared machines must necessarily cost more money, and the wear and tear on the whole machine is greater, I am inclined to believe that in a few years we will, most of us, be of the opinion that the single belt geared drive was not the success which we had expected.

It is not many years since the cutting tool or steel man came around and told us that his steel would stand more than the machine was able to do, but I have not heard that remark passed in the last two or three years, which goes to show that the machines themselves have been perfected beyond the tooling point. It is all very well for a manufacturer to say that his machine will remove so many cubic inches of stock a minute, but in actual practice that does not interest us as much as to have the machine run 365 days in a year, if need be, without repair, and do one piece after another with perfect accuracy. As you see, I am not a very strong advocate of the single pulley drive over the old cone type.

Automobiles do not seem to be getting much cheaper in price, but we are giving more horsepower for the same money. The tendency is toward larger bore and longer stroke engines, which mean larger and heavier motor parts throughout. This, of necessity, is reflected through the whole car. The requirements all along the line will be for heavier machine tools to take care of the increase in size and horsepower of the cars. We used to think that an engine with a 5-in. bore was a large car and mostly for racing purposes. In looking over a list of some of the American cars, I find there are 44 makers of cars using engines with 5-in. bore, or larger, for the present, or 1910 season in standard touring cars, and I feel sure that there will be more next year.

Milling Machine and Lathe Suggestions

I think you are building some fine milling machines. They are very powerful, and have all kinds of feeds and quick change gears for feeds, speeds, &c. Now, these same machines are just like the universal milling machine, except that the table does not swing. As only a small part of the work done on a universal miller requires the moving of the swinging table, the machines are knee type and to all intents and purposes universal. As a rule, we use universal machines chiefly for tool work. The question I wish to raise is this: Do we need all these attachments and feeds in the same machine? Why not make them optional?

The same thing applies to lathes. We buy lathes with all kinds of quick change appliances, feeds, stops, &c., but do we really need them, or do we buy them because you force them on us against our will? We do, however, like the wide heavy carriage, the large bearings and rigid tailstock. A lathe used to be a simple machine; it was one of the first, if not the first, on which we started the apprentice to work.

Take a walk through almost any automobile factory

and notice the character of the work the men are now doing. Notice how often they use the change gears, &c., in getting out a large quantity of work. You are getting lathes to a point where they are almost universal in scope. I do not think we want a shop full of universal machines, the greater part of the attachments on which will never be used. As it is now, it is like buying a universal grinder with all the attachments, extra spindles, &c., and putting into it work that should be done on the ordinary plain grinder. This would be the hight of folly, for we would be getting no return whatever for our extra investment, and I am forced to look at some of the so-called standard machine tools which are being built at the present time in this light.

It is rather hard for us to expect the average man who cannot even read a micrometer to turn out accurate work on a complicated machine. We have been tied down to the old established precedent that every lathe called for a large and small face plate, steady rest, &c., but I think if we had lathes built that could be bought either with or without plain rest, compound rest, quick change gears, or screw cutting attachments, and still have these attachments so they could be procured and put on at any time, it would save us considerable money on our investment.

There is very little work we finish on a lathe now. No matter whether it is straight or taper, inside or outside, we invariably have a little to grind whether it is to be hardened or not. This makes the lathe only a roughing machine at the best, but it must be able to rough accurately and true in order to leave a uniform amount to grind or finish.

The newer crank shaft turning lathes have proved very satisfactory. A number of us have tried grinding from the rough, but have given it up one after another. We may start off with drop forged cranks near enough to grind out readily, but the dies wear and we have trouble, and eventually come back and rough turn them on the lathe. I think it will be a fine thing when we can finish them in a grinder from the rough in an entirely satisfactory manner.

Grinders and Drills

The manufacturers of plain grinders are moving in the right direction by making their machines heavier. High speed machinery must be heavy and stand firmly on the floor or foundation to be satisfactory. I do not think it pays to be saving with your iron in the designing of grinding machinery. The whole machine, bed, table, wheel carriage, &c., must be very heavy, enough so, at least, that it will not synchronize with the vibration of the spindle, or the result will be poor work. We buy these machines and put them to work, and no doubt they do not get the attention they should, but we expect them to do good, accurate work, although they may not be adjusted to a fine point at all times. The same holds true in all classes of grinders, internal as well as external, and with the large milling cutters and tools we have to grind. I think the tool and cutter grinders might be made heavier without losing any of their efficiency.

We are using water grinders in new ways more and more, and find they give the cheapest finish as well as the best and most accurate. This applies to soft parts as well as hardened ones. They save quite an item in float files and emery cloth. A large part of the different pieces that go to make up a first-class automobile have operations on them in the grinding departments at some time before they are finished and ready for the stockroom. We want in the future to finish more and more from the rough casting or forging without any previous or roughing operation. This applies to round as well as flat surfaces.

In the way of drilling and vertical boring machines we have used and shall continue to use still more multiple and special tools. While we now drill 10, 15 or 20 holes on one side of a piece, I see no reason why we should not be drilling as many more on the other side at the same time just as we mill or turn a piece on two or three sides at the same time. These special and multiple drills make a very nice proposition for motor drive, as the load is very even. High speed twist drills are used by almost every one, and all drilling and boring machines should be arranged to take care of this.

We are using the gang drill press in successive operations to good advantage, and on large and long holes are getting a very cheap production, as one man can run a number of presses in one gang or set.

Strong and accurate interchangeable tools and fixtures that would be almost, if not quite, universal in scope for holding the pieces to be machined would be an added inducement to the purchase of the drills if they could be furnished in this way. The engine has had more special machinery built for it than any other part of the car, but the crank case, which carries it, seems to have been neglected except in the matter of multiple drills. I think there is a market for some horizontal boring and reaming machines with two or three spindles, having movable centers for boring out crank cases and transmission cases. On a crank case for an L motor we require two bars and a T-motor case, three bars for the crank shaft and cam shaft holes. As it is now, we buy a horizontal drill, and have to equip special driving heads to run these bars, and this also shortens the space on the bed of the machine. If such machines are made, I do not know of them, and will say we are in the market for two or three right now.

Screw Machines and Gear Cutters

On the automatic screw machine we want greater production with accuracy. We also want machines which require the minimum of repairs. In the hand screw machines we are looking for new and original ideas for holding and tooling the pieces for chuck work and second operation. Some of the large bar machines are going to prove to us that they can make gear blanks cheaper from the bar than from the forging. The turret machine builders have the right idea in enabling us to buy the bare machine or with as many outfits or tools as we require.

Regarding gear cutters, I do not think of anything other than what I have said in a general way. I do think, however, that some one should get up a machine or attachment for grinding rotary gear cutters and hobbs after they are hardened so that they will be absolutely correct. It might make the cutters more expensive, but with the increased wear we get from high speed steel they would be well worth the money.

Examples of Special Machinery

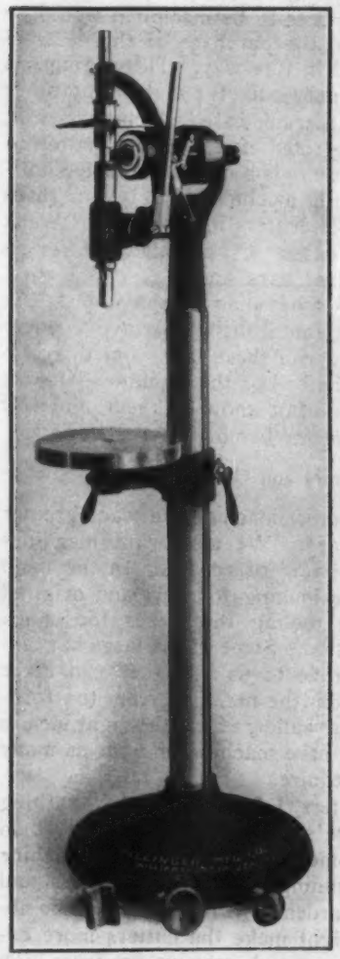
As I have already told you, I am in favor of special machinery for doing one thing, and that well and quickly. I will give you only two or three examples which perhaps you will not think of. We are all using square holes, more or less, in our transmission gears. There should be a good sale for a machine to bore out a round hole into a square one within a reasonably close limit. This could be done either vertically or horizontally, and does not seem to me to be a very difficult operation. We would be willing to run a sizing broach through if it were necessary, but when we have to broach out a long sliding gear hub made from high-grade alloy steels from the round hole, it is a long and seemingly unnecessary operation.

There are an enormous number of cotter pin holes to be drilled in the ends of bolts and studs. I do not see why we should not put them into a hopper and have them come out all drilled automatically. The same is true of castleated nuts. I do not see why these should not be slotted by an automatic machine as well as threaded. Then we have the square shafts that fit in the same square holes. These should be ground with a form or master doing the flats and corners all in one operation, in the same manner in which we are now

grinding the cam shafts. After machines of this character have been perfected, I do not see why they should not be standardized and sold as such.

The Williamsport Friction Drill

The new 14-in. Williamsport friction drill made by the Villinger Mfg. Company, Williamsport, Pa., has a speed changing device consisting of a shifting driving wheel which operates toward and away from the center of a friction disk. The levers controlling the motion of this wheel are so connected with the feed lever that a slight movement of the latter to either side results in a corresponding change in the speed of the spindle. In this way the operator can instantly secure the speed best suited to the work being done without shifting belts or loosening set screws. This overcomes the breakage of drills, which results from the use of improper spindle speeds. The driving wheel is built up of leather fiber, clamped between two disks, and is claimed to be entirely free from slipping. This device has a wide range of speed and, as the disk is counterbalanced with a spring, which prevents slipping and loss of power between it and the driving wheel, a large amount of power is transmitted to the driving wheel shaft.



The 14-In. Williamsport Friction Drill Made by the Villinger Mfg. Company, Williamsport, Pa.

The spindle is carbon steel and runs in bronze bearings. The upper bearing is supported by a metal bushing running in a frame bearing, which prevents the keyway from cutting the journal and eliminates wear on the spindle, except that caused by the sliding movement. The construction of the spindle mechanism is such that when the feed lever is raised to its highest point the spindle automatically stops and starts to revolve again the instant the spindle is fed toward the work. The drill thus runs only when it is actually working. This simple device obviates the necessity for shifting belts and, therefore, no countershaft is required. A ball-bearing thrust collar on the spindle eliminates almost all friction and insures a smooth running spindle.

A column is provided with a keyway running the entire length. The table is counterbalanced by a weight inside the column hung on a chain. The table can be adjusted vertically or swung from side to side easily and can be locked in any position. The support for the table is provided with a lug cast on the right side, which is counterbored to receive a stud. A key to fit the way in the column and a pin are provided at the inner and outer ends of the stud. Turning the pin parallel with the keyway causes the key to slip in place and centers the table with the spindle at any point.

The principal dimensions follow:

Maximum size of drill, inches	½
Distance from column to center of spindle, inches	7¼
Greatest distance between spindle and table, inches	30
Traverse of spindle, inches	2¾
Diameter of spindle, inches	1
Morse taper in spindle, No	1
Table diameter, inches	11¼
Diameter of driving pulley, inches	5
Face of driving pulley, inches	2
Speed, revolutions per minute	700
Total hight, inches	68
Net weight, pounds	200
Shipping weight, pounds	250

Three styles of centers, a point, a cup and a V, are provided with the machine.

The Sargent-Brosnihan Pipe Wrench

The pipe wrench shown in the accompanying illustrations, in addition to the general uses to which its type is put, is particularly serviceable in the machine shop, as it can be employed in place of a dog and a monkey wrench for holding work for drilling in the lathe. It is manufactured by the Brosnihan Wrench Company, 31 Hermon street, Worcester, Mass. Being adjusted and operated by one hand, the other is left free to hold and guide the pipe. Its mechanism combines the wedge and screw. The movable wedge or sleeve jaw is held against the work by a spring grasping it instantly on the downward movement of the handle bar, and thus preventing lost motion. It can be set delicately, so as not to crush thin pipe, and it can be readily released and removed from the pipe. The jaws are of tool steel, hardened and tempered in oil. The bar sleeve and screw are case hardened. Extra jaws can be furnished at a slight cost for replacements. Four sizes of wrench are made, 8, 10, 12 and 18 in. All wrenches 12 in. and under have wooden handles, Fig. 1, and the larger sizes are provided with steel handles, hollowed on the sides to give a firmer grip, Fig. 2. The 8-in. size has a capacity from No. 8 wire to ¾-in. pipe; the 10-in. size from No. 8 wire to 1-in. pipe; the 12-in. from No. 8 wire to 1½-in. pipe, and the 18-in. from No. 2 wire to 2-in. pipe.

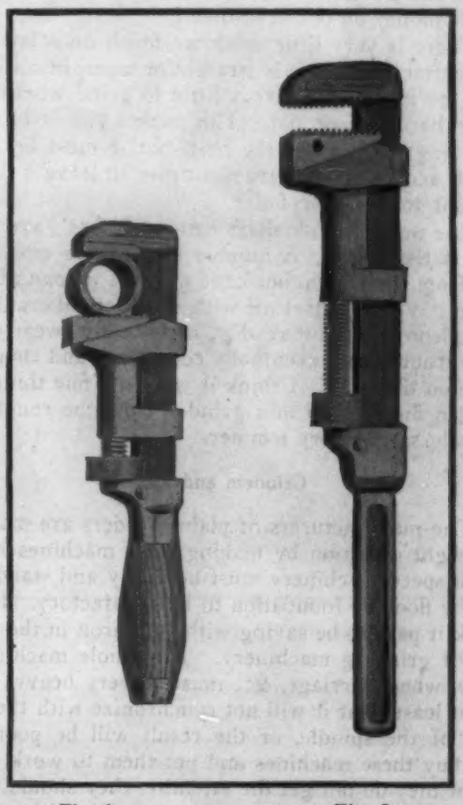


Fig. 1. Fig. 2.

Two Styles of Sargent-Brosnihan Pipe Wrench, Made by the Brosnihan Wrench Company, Worcester, Mass.

The Herrick Rotary Engine

The First with a Steam Balanced Rotor

An account of the dinner at which the invention of the Herrick rotary engine was first publicly announced appeared in *The Iron Age* last week. This stated that the principal accomplishments in the development of this engine were the elimination of sliding parts in contact in the steam spaces under load, and radial pressure on the bearings due to the steam pressure. How these two very important ends have been attained may be understood from the following description in connection with the illustrations herewith presented of the engine exhibited at the dinner, and are the features for which particular credit is due the inventor, Gerardus P. Herrick. The principle of the drive of the engine is not new, having been employed in more or less similar ways by many earlier experimenters. They realized the defect inherent in this design, that of unbalanced radial thrust on the bearings of the rotor, but it remained for Mr. Herrick to discover the means of counteracting this pressure by admitting steam under the rim of the rotor of the same pressure as that within the working chamber at all stages of the steam's expansion. Before describing this detail further it will be well to understand the

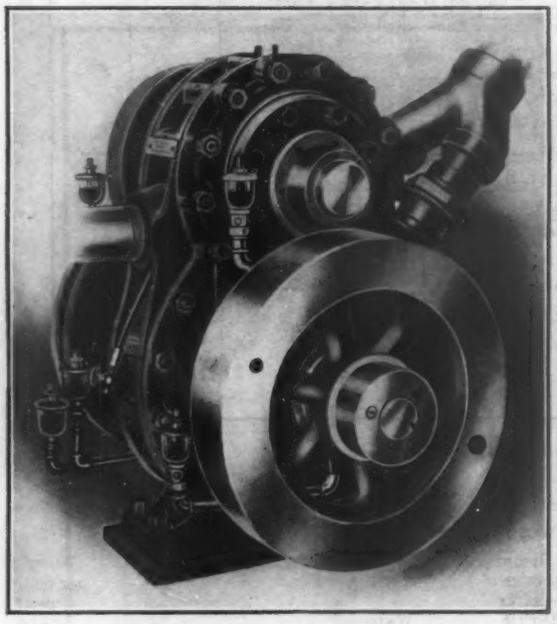


Fig. 1.—The Herrick Balanced Rotary Engine No. 2.

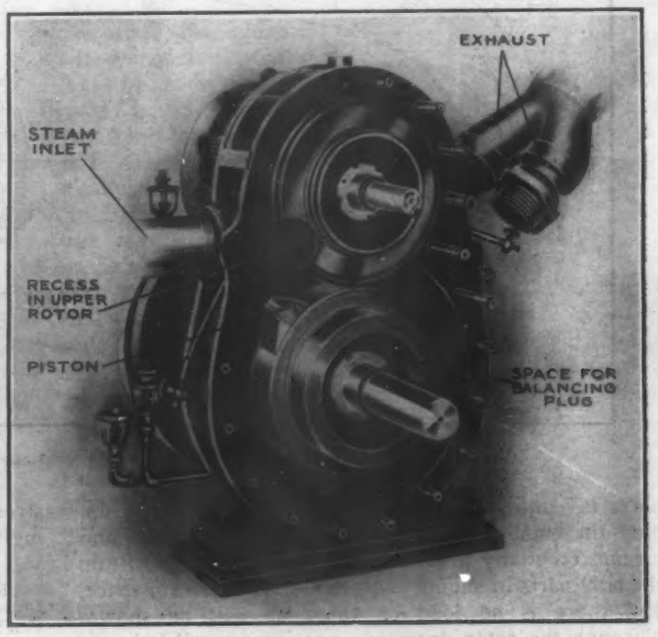


Fig. 2.—The Side Plate Removed, Showing the Piston at Cut-off.

Main Features of the Engine

Fig. 1 is a general view of an engine, which is of approximately 20 brake horsepower; Fig. 2, a view of the engine with the side plate removed, showing the piston at the instant of cut-off; Fig. 3, side and cross sectional elevations of the engine, and Fig. 4, a view of one of the so-called balancing plugs, the function of which will be explained later.

The construction and action of the engine may be best described with reference to the first three illustrations. The principal parts of the engine are two drums of equal diameter and length rolling in contact within the casing. The upper part of the casing closely fits the upper drum. The lower part is of larger diameter to accommodate the projecting blade on the lower drum or rotor. The blade corresponds to the piston of an ordinary reciprocating engine, and revolves continuously in what may be compared to a circular steam cylinder. The upper drum contains a recess formed to mate with the piston blade like a single toothed gear, and provides the means of passing the piston at the completion of each cycle and at the same time serves as the admission and cut-off valve. The drums are positively rotated in synchronism by spur gears on the outer ends of their shafts. The contacting surfaces of the two drums form an abutment corresponding to the cylinder head in a reciprocating engine.

In the view given in Fig. 2, the piston has just begun its stroke, its rotation being counter clockwise, and the recess in the valve drum has revolved to the point where the steam is cut off. The steam inclosed in the space back of the piston now acts expansively rotating the piston in a continuous circular path, and is exhausted through a port in the side wall of the casing when the piston passes it. The same condition of affairs is shown in the side elevation given in Fig. 3, and the dotted lines indicate more clearly the form of the steam admission and exhaust ports and another very interesting feature, the provision for recovering the steam, which at high pressure is pocketed in the recess in the valve drum, and under ordinary conditions would be carried around to the exhaust and wasted. In the side walls of the valve drum casing are circular grooves, extending about half-way around the upper half of the casing. After, but not until, the valve drum recess has passed the steam admission port, it is in communication with these grooves, so that the steam can escape through the grooves and then through ports to the space back of the piston in the lower part of the casing. Thus this steam is used expansively with that originally admitted behind the piston up to nearly the instant of exhausting.

The Counter Balancing Arrangement

It is plain to be seen that with a rotor of simplest form there would be an unbalanced pressure of constantly changing direction and decreasing intensity, while the piston passes from the beginning to near the end of its cycle. The ingenious manner in which this

has been overcome may be seen in Fig. 3 in the sectional elevation. It will be seen that the rotor is hollow and connected with its shaft by a web, the sole purpose of which as will be shown is to transmit the rotation to the shaft. Extending within the interior of the drum on each side are circular projections from the end cover plates which are known as balancing plugs. One of these is shown in Fig. 4, from which it is plain that the external surface of the plug is not continuous but interrupted, being formed with a series of inclined shallow pockets 1-32 in. deep, leaving as the

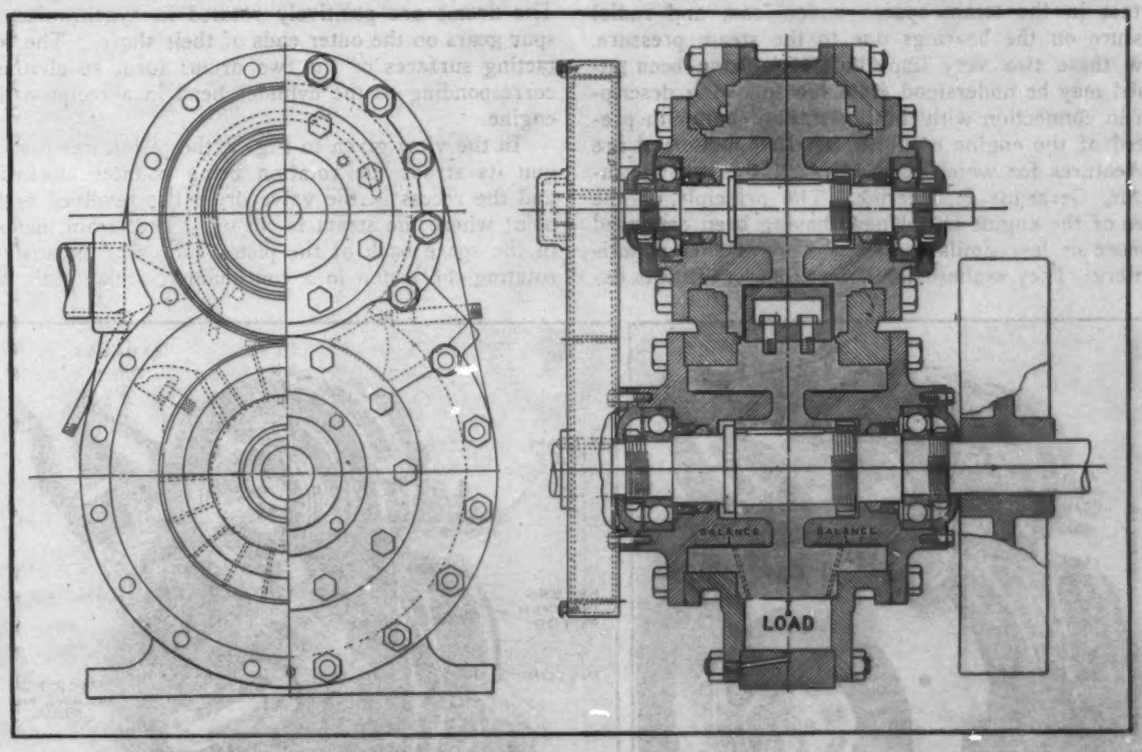


Fig. 3.—Side and Cross Sectional Elevations of the Herrick Rotary Engine.

parts in contact with the interior of the rotor drum only the small division ribs between the pockets and circumferentially around their ends. These constitute the only parts in sliding contact within the steam space, and there is no load on these as will be shown. Through the rotor drum are numerous small holes to establish communication between the working space and the shallow pockets in the balancing plugs, so that the constantly changing area and intensity of pressures on the exterior of the rotor are correspondingly varied on its interior surface. A uniform pressure admitted within the rotor would be of no avail, as it would at best produce balance during one limited period of the stroke. The balancing chambers are successively and automatically connected with the steam space by the passages in the rotor, and as the piston revolves and the area of the rotor exposed to pressure increases, the counter balancing area is correspondingly increased, and the pressure exerted on both sides is equal so that the rotor may be truly said to float in steam. The ribs between the balancing chambers act as checks to prevent the steam from leaking circumferentially around the balancing plugs and to maintain the graded pressures in the differing numbers of chambers in action.

The piston of the rotor is not in contact with the walls of its casing, a mechanical clearance of a few thousandths of an inch being purposely left. Even though this entails some waste of steam by leakage, it is warranted by the greatly reduced friction. As has been demonstrated by tests relatively little steam has opportunity to escape over the outer end of the piston, and the sides of the piston are grooved radially to discourage steam from leaking around the edges of the piston. Any steam tending to escape ultimately condenses and a water packing results. To further reduce mechanical friction the shafts of the valve drum and rotor are mounted in Hess-Bright ball bearings.

Tests of the Engine

Tests were made upon this engine at the Stevens' Institute of Technology, Hoboken, N. J., under the direction of Prof. Frederick L. Pryor before and after an endurance trial made at the Degnon Contracting Company's plant at the foot of East Forty-second street, New York City. In the initial test, the following were the results:

Duration of tests. Min.	Steam pressure after throttle lb. per sq. in.	Revolutions per min.	Water per hour. Lb.	Generator readings. Volts.	Amperes.	Kw.	Brake horse-power.	Water per hour per brake horse-power. Lb.
	Steam—Dry Saturated. Exhaust—Atmospheric.							
40	105.3	1,010	782.6	228.06	38.61	8.80	13.38	58.5
40	115.3	1,012	855.4	227.80	45.38	10.33	15.58	54.9
40	125.6	1,007	920.6	228.17	50.19	11.45	17.18	53.6
40	135.2	1,010	979.9	227.80	55.27	12.59	18.82	52.0
40	145.0	1,006	1,039.1	228.67	60.12	13.74	20.48	50.7
	Steam—Dry Saturated. Exhaust—18.4 In. of Hg.							
40	105.6	1,000	790.9	227.57	51.74	11.77	17.64	44.9
40	115.2	1,012	862.5	227.96	57.30	13.07	19.52	44.2

Altogether, the performance may be considered creditable for an engine of its size and power; that it is very compact for its power is shown by the following dimensions: It is 25 in. high, 17 in. wide, 21 in. thick, stands on a base 4 x 16 in., and weighs only 835 lb. The endurance run lasted for 1685 hours, and was made at an average speed of 955 rev. per min., with the output from the generator to which it was directly connected, varying from 2000 to 5000 watts per hour, according to the demand for lighting. On 66 days the engine ran 17 hours per day, on 18 days 24 hours per day, and one run was made of 149 consecutive hours. These practical working conditions demonstrated quite effectively what may be expected of the engine in the way of reliability. Following this trial the engine was returned to the Stevens' laboratory and a second steam economy test conducted, the results of which are as follows:

Dura-tion of tests. Min.	Steam pressure after thr'tle lb. per sq. in.	Revolutions per min.	Water per hour. Lb.	Generator readings. Volts.	Amperes.	Kw.	Brake horse-power.	Water per hour per brake horse-power. Lb.
Steam—Dry Saturated. Exhaust—Atmospheric.								
40	105	1,007	728.3	226.22	31.41	7.11	11.30	64.5
40	115	1,017	784.5	228.72	37.04	8.47	13.23	59.3
40	125	1,013	854.3	229.19	42.58	9.76	15.10	56.6
30	135	1,010	934.0	228.50	48.21	11.02	16.95	55.1
40	145	1,010	1,007.3	228.17	54.70	12.48	19.15	52.6
Steam—Dry Saturated. Exhaust—19.2 In. of Hg.								
30	115	1,008	830.0	229.57	53.81	12.36	18.95	43.8
Steam—Dry Saturated. Exhaust—Atmospheric. No Load.								
30	43	1,015	359	....	....	....	1.5	239.3

A comparison of the two tables of results shows that the engine used less total steam at the same pressures and speeds in the second test than in the first, which apparently indicates that the engine had less leakage after the endurance run than before. However, there was also a decrease in the brake horsepower developed, which was not entirely offset by the decreased leakage and therefore accounts for the slight increase in the water rate. It was found upon dismantling the engine that there had been rubbing within

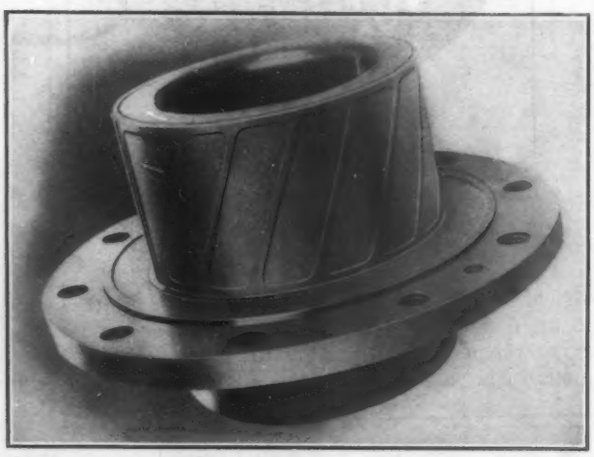


Fig. 4.—One of the Balancing Plugs, Showing the Balancing Chambers.

it due evidently to the misadjustment of a bearing which would easily account for the loss of power and also for reduced leakage. As the rubbing took place where there should be no friction it would very probably account for the slight increase in the water rate.

Applications of the Engine

Apparently the engine may be regarded as occupying a position somewhere between the reciprocating engine and the steam turbine. Its speeds are intermediate and it combines some of the advantages of both. One very important one is the rotary motion of the turbine with consequent absence of vibration.

Luther D. Lovekin, chief engineer of the New York Shipbuilding Company, is responsible for suggesting one of the most promising applications, the use of the rotary engine in combination with a steam turbine, the engine exhausting into the turbine. The rotary engine is better adapted to high pressures than a steam turbine and is equally capable of handling steam at high superheat. Mr. Lovekin has carried calculations through assuming a plant consisting of three rotary engines in series directly driving the middle propeller of a triple screw vessel and developing at this shaft about 6000 brake hp., while the exhaust in the engine is utilized in Parsons or Curtis turbines driving the outer screws, each developing about 15,000 brake hp. It is further supposed the steam will be taken by the rotary engine at a pressure of 280 lb. absolute with a superheat of from 100 to 200 deg. F. and exhausted to the turbines at a pressure of about 140 lb. absolute. It is calculated that for a power plant of this size, 36,000 brake hp., there would be consumed about 390,000 lb. of steam per hour, or at the rate of 10.8 lb. per brake hp. hour. Applied to such a vessel as the Mauretania he believes that the trip across the Atlantic could be shortened about five hours without increasing the present coal consumption, or at the same speed could save from 20 to 25 per cent. in coal, or about 1,000 tons each trip. In a battleship such as the North Dakota he believes that three-quarters of a knot an hour could be added to the speed with the present coal consumption, or 1/5 to ¼ of the coal saved at the present speed. In other words at cruising speeds the steaming radius could be increased 20 to 25 per cent. F. L. Stevenson, of the International Harvester Company, also who has investigated the engine, regards it as the equal if not the superior of an ordinary noncondensing reciprocating engine in almost any service, with respect to its dimensions for its output, cost of up-keep, first cost, attendance and operating economy. It would seem therefore to have an extensive field of application in stationary or land uses quite as much as for installation on shipboard.

An organization controlling the patent on the engine has already been effected, the Herrick Engine Company, 74 Broadway, New York City. Arrangements to manufacture have not been made as the holding company has yet to decide whether it will manufacture directly or dispose of the rights to licensed builders.

Jones & Laughlin's New City of Woodlawn

Woodlawn, the new city which is being built by the Jones & Laughlin Steel Company, near the new furnaces, steel mills, rod, wire and tin mills of its Aliquippa department, will add a beautiful new suburb to Pittsburgh, one of which the greater city will be proud. It is estimated that within a year its population will be 10,000. There is no more active place in the Pittsburgh district to-day than Woodlawn, with several thousand men of the building and contracting trades erecting 500 pretty homes and grading, paving, sewering and laying conduits in the streets of the new city, constructing office buildings, stores and schools and working as a unit to the completion of this new community which is springing up in the wooded hills and romantic valleys 20 miles down the Ohio River from the Iron City. It is located on the main line of the Pittsburgh & Lake Erie Railroad.

Work was commenced on Woodlawn last summer and some of the houses were completed in time for winter occupancy by Jones & Laughlin employees, while others are being taken almost as fast as they are finished. The new works are attracting iron and steel workers of the better class and the new town is designed to give them the very best homes with the most beautiful, convenient and healthful surroundings. The houses being put up by the company contain from 6 to 10 rooms and bath, are constructed of brick, cement or frame or combinations of these materials, and are in every respect as attractive and convenient as any suburban town in the district can show, and are above the average city home in point of comfort and convenience. They are rented or sold only to Jones & Laughlin employees.

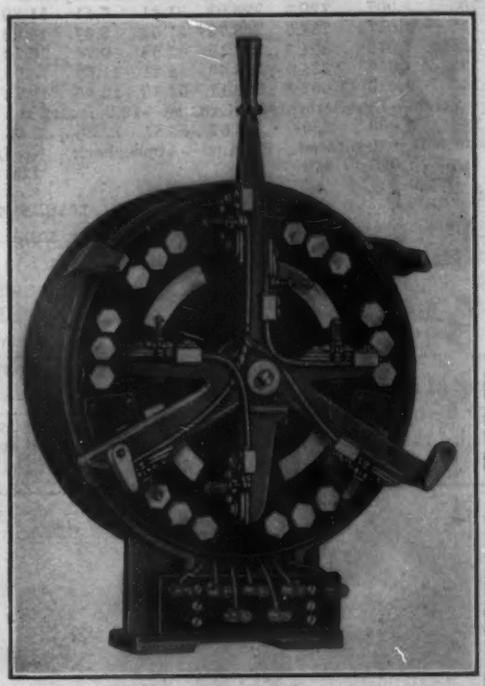
Beall Brothers, East Alton, Ill., are rebuilding their plant which was recently destroyed by fire. The new plant will be of fireproof construction and will consist of one building 50 x 333 ft., another 60 x 120 ft., another 32 x 132 ft., another 54 x 90 ft. and another 40 x 100 ft. The products manufactured by this firm consist of railroad track tools, picks, mattocks, grubbing hoes, wood choppers' tools, brick and stone masons' tools and wrought washers.

E. C. & M. Alternating Current Controllers

For operating cranes and other electrically driven mill machinery direct current motors were formerly used almost exclusively. Now, however, alternating current motors are being used more extensively because of the advantages which alternating current has from the standpoint of transmission. The highly desirable characteristic of high starting torque for this work is possessed by the series wound direct current motor. The slip ring type of alternating current motor more nearly possesses this feature than the squirrel cage model, and as a consequence in the development of alternating current motors for operating cranes, mill tables and other machinery of a similar nature, where the direction of motion is frequently reversed, preference has been given to the slip ring model. In the use of this motor, speed and torque control are obtained by inserting a resistance in the field circuit and varying its value as circumstances may require.

To meet this demand the Electric Controller & Mfg. Company, Cleveland, Ohio, has developed a comprehensive line of manually operated controllers for slip ring alternating current motors, in sizes ranging from 1 to 100 hp. As closely as has been possible, these controllers follow in construction and design the direct current types which this company has been manufacturing for some time, and to a large extent the wearing parts of both the alternating and direct current controllers are interchangeable. The accompanying illustrations show models designed for use in connection with reversing slip ring motors using either two or three phase current. Fig. 1 is a controller manufactured under the Dinkey patent, and Fig. 2 the company's standard type G. As will be noticed from Fig. 3, which shows some of the details of one of these controllers, there are only seven leads. The resistance is entirely self-contained in the ordinary models, but where heavy currents are handled a cast iron grid resistance is employed, and special care has been taken to have the insulation permanent.

All the heavy copper contacts are mounted on a vertical slate face with sufficient space so that dust cannot lodge between the segments and cause short circuits. The contacts are reversible and the use of screws or bolts with special threads has been avoided. As far as possible the wearing parts have been designed so that they can be manufactured by the user in his own repair shop should it become necessary to make repairs. The manufacturer considers a lever motion the most advantageous for crane and mill service and has provided for the operation of all these controllers in that way. In addition to the controllers for slip ring motors, which are shown in the accompanying illustrations, the company can also furnish controllers for both the squirrel cage and commutating types of alternating current motors.



An Alternating Current Controller Without Contained Resistance.

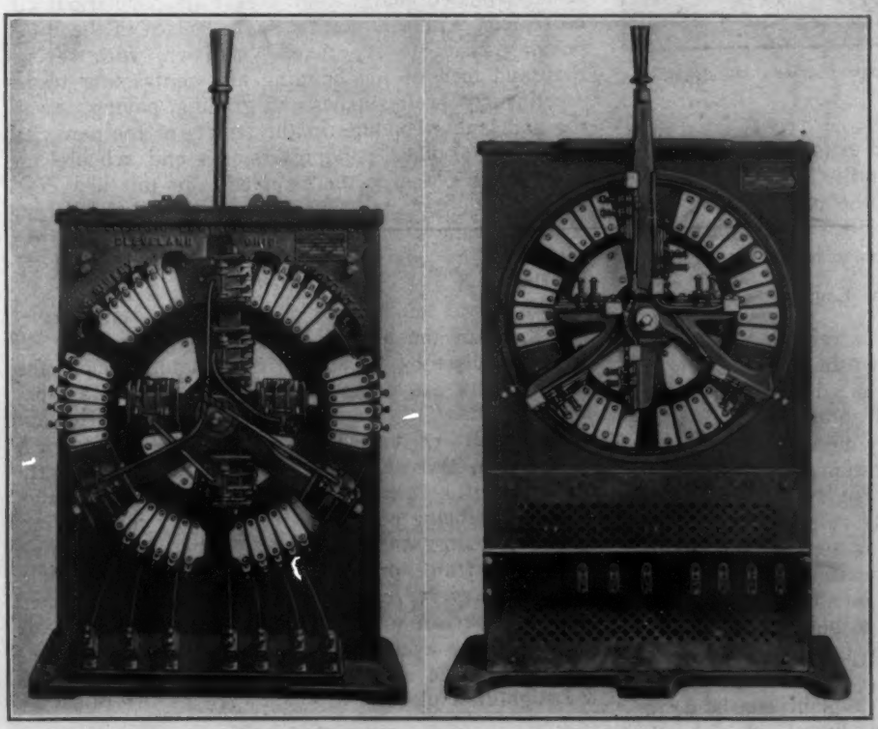


Fig. 1.—Dinkey Patent Controller. Fig. 2.—Type G Controller.

Two of the New Controllers for Slip Ring Motors Made by the Electric Controller & Mfg. Company, Cleveland, Ohio.

The Board of Trustees of the Rensselaer Polytechnic Institute offers five scholarships open to male graduates of academies, registered academic schools, high schools and academic departments of union schools included as secondary institutions under the Board of Regents of the State of New York. Each scholarship will entitle a student to free tuition for four years. The tuition is $200 a year, so that the scholarship will be worth $800 for the four years. All correspondence relating to this subject should be addressed to the director of the Rensselaer Polytechnic Institute, Troy, N. Y.

Governor Draper of Massachusetts has vetoed a bill making 8 hours a day's work for public employees.

Electric Tramming at Iron Mines

The Single-Motor Locomotive as Used on Lake Superior

The use of electric locomotives for tramming in the deep iron mines on the Lake Superior ranges has been increasing in the past half dozen years, and the development of better efficiency and economy has been the natural result of the co-operation of the engineering staffs of the mining companies with the manufacturers of electrical equipment. Some account is given in *Electrical Mining* of the work done by the new Goodman "iron mining type" of single motor locomotives, which, being heavier and having special features adapting them to this service, have replaced the Goodman single motor locomotives of the old bipolar type in the Pioneer mine of the Oliver Iron Mining Company, at Ely, Minn. From this account the following details are taken of the performance of the new type locomotives and the way in which the tramming problem has been handled at Pioneer and Zenith mines of the Oliver Iron Mining Company.

Fig. 1.—Goodman Locomotive of the "Iron Mining" Type at Zenith Mine, Ely, Minn. Chute Through Which Cars Are Loaded with Ore from Sub-Levels.

There are two shafts at the Pioneer mine. Both are sunk through the rock, well back from the ore body, which is reached by rock drifts at the various levels. The ore body dips from west to east at an angle of about 20 degrees from the vertical. The A shaft is vertical, so that each succeeding rock drift is longer than the one above; the B shaft, more recently sunk, is at an angle of 20 degrees from the vertical, thus following approximately parallel to the ore. The work in this mine is now being done on the twelfth level, 1056 ft. below ground.

Tramming from the ore chutes to the "stations" at the shafts is done by 6½-ton Goodman locomotives. There are six of these in the Pioneer mine, four of them being in constant service, while the fifth is being cleaned, and the sixth is on spare, ready for duty in case of accident to one of the four at work.

The locomotives are built without sand boxes, no sanding of rails being necessary in iron mining, because the ore does this work only too well. Special provisions are made for inclosure of the armature, gearing, &c., so as to prevent entrance of the ore to parts where its presence would have serious results. The nature of the haulage and the conditions under which the locomotives operate are such that special grid rheostats are provided, supported on springs above the motor shell of the locomotive. The trolley pole socket, attached in central position on the motor shell, passes freely up through a large hole in the center of the rheostat. The locomotives are arranged for a double end control, a feature of importance in this work, as will be noted later.

The Cycle of Tramming Operations

Starting at the shaft station, the locomotive, drawing the empties behind, runs to the ore body and into a drift where cars previously placed at intervals under the ore chutes from sublevels above now stand loaded, waiting to be taken to the shaft. Running into this drift, the locomotive bumps the loads ahead and drops off empties behind, beneath the same chutes, thus making up a new trip of loads in front as the trip of empties is left behind. The empties are uncoupled behind by the chutemen; the loads are coupled up ahead by the switchman. Thus made up, the loaded trip is pushed around back to the main drift and thence to the shaft station.

Fig. 1 illustrates the similar operation in Zenith mine. Above the locomotive appears the lower end of the chute from the sublevels above. From beneath this chute the locomotive has pushed one of the loaded cars now coupled ahead of it, while behind come empties, one of which will be dropped at the same point.

At the station the track is carried on timbers across large pockets, into which the ore is dumped from the

Fig. 2.—Pushing the Cars Across the Ore Pockets at the Shaft Station.

cars as they pass, and from which it is loaded into the skips for hoisting to the surface.

Beyond the pockets, the drift is carried ahead to a dead end, a sufficient distance to accommodate the necessary length of trip to be handled. As the loaded trip, pushed by the locomotive, passes over the pockets, the side dump doors are opened on both sides by striking their latches with heavy bars wielded by the regular switchman on one side and the pocketman on the other. Fig. 2 shows the last car of a trip standing on the pocket at the station, ready for dumping. Except as the pockets are filled more rapidly than the skips carry away the ore, the trip passes continuously across without stopping, the men opening the doors rapidly with their bars and cleaning out such ore as may cling.

The last car dumped, the trip is ready to go back empty behind the locomotive, as did its predecessor. The motorman therefore reverses his trolley pole and takes his position at the other end of the locomotive, Fig. 3. The switchman rides on the forward end of the locomotive until the loads are reached, when he gets off and does the work of coupling.

The locomotive thus always loops back to the station and always reverses at the station, its double end control permitting the motorman to work always in the same position relative to his trip, regardless of the reversals of the locomotive at the station.

In this mine the limit of the trip is 20 cars, this being as many as can be run into the dead end of the drift beyond the station. When 21 or more cars must

Fig. 3.—Ready to Start Back from the Shaft Station, with Empty Cars Behind.

be brought in one trip, they cannot all be dumped, and the excess over 20 must go back and return with the next trip. The average trip is 18 cars, which can be handled nicely.

In the Zenith Mine

Haulage conditions in the Zenith mine are similar in character to those at the Pioneer, but the ore body is smaller and the production much less, so that usually the entire work may be handled by one locomotive. The rule, however, that there shall be two locomotives more than must be always actually in service, calls for three locomotives in this mine—one doing haulage work, one possibly partly dismantled for thorough cleaning, one on spare duty ready for emergency call in case of accident to the working locomotive.

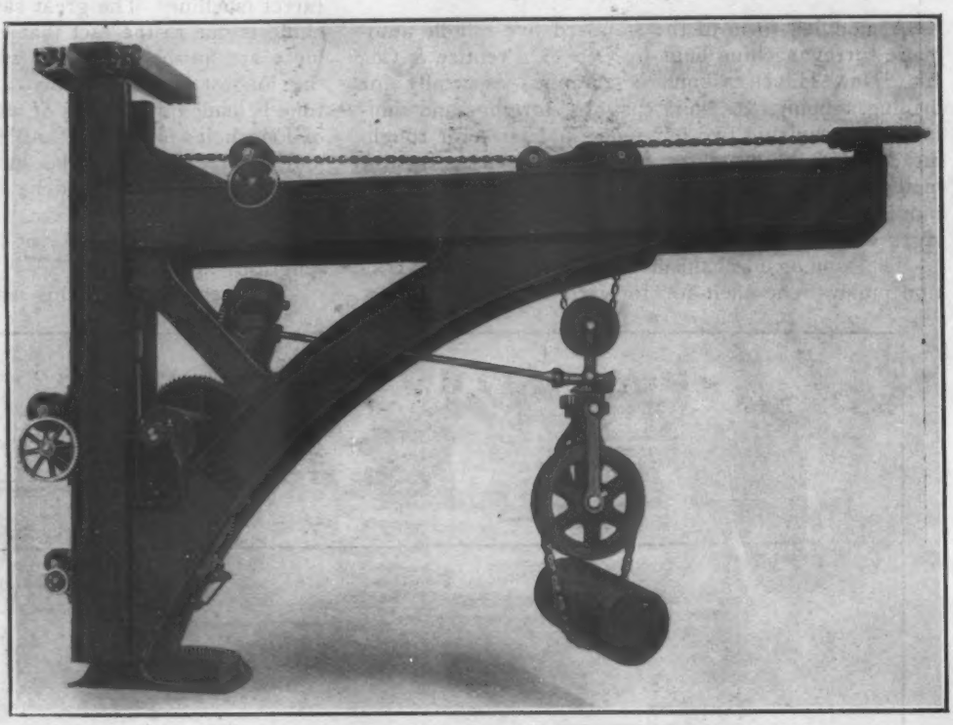
The conditions of the tramming are such that a total trip of 18 cars, some of them loads ahead and some of them empties behind, may be on two or three sharp curves at one time. This makes hard work, especially as the locomotive must stop and start at frequent intervals under these conditions. The hauls are short and no high speed is necessary. The work, therefore, is heavy hauling. Tractive power here is the main thing; running speed is of little consequence. The single armature, geared to both axles, makes all wheels operate together as a unit of driving power. This advantage is given ultimate practical effect by the flexible truck construction, which makes all four wheels always equal in their contact on the rails.

The United States Radiator Corporation.—The new United States Radiator Corporation has elected R. J. Gross, Dunkirk, N. Y., president; Harry T. Cole, Detroit, vice-president, and J. J. Blackmore, New York City, secretary. This is the new company which has taken over the properties of the United States Radiator Company, Dunkirk, N. Y.; United States Heater Company, Detroit, Mich.; Herendeen Mfg. Company, Geneva, N. Y., and the heater department of the J. L. Mott Iron Works, New York City. As previously stated, the company has an authorized capital stock of $8,000,000, consisting of $4,000,000 common and $4,000,000 7 per cent. cumulative preferred. A mortgage has been made to secure $1,000,000 6 per cent. bonds, which, it is stated, have been underwritten by a syndicate headed by the First National Bank of Detroit and the Citizens Savings & Trust Company of Cleveland. The company began business June 1, manufacturing not only radiators, but also steam and water heating boilers. The headquarters will be at Dunkirk, N. Y.

The Chamber of Commerce and Manufacturers' Club, Buffalo, N. Y., has raised by private subscription a fund of $100,000 to be used for city development purposes, including the establishment of an Industrial Bureau, a Publicity Bureau and a Conventions Bureau.

The Johnston & Jennings Billet Rotating Mechanism

A device designed for use with a forge crane for rotating billets or ingots under a power hammer has been perfected by the Johnston & Jennings Company, Cleveland, Ohio. Its use decreases the number of laborers required in the hammer crew, because only the balancing tongs at the end of the ingot are necessary. It is possible to revolve very heavy billets in from 2 to 5 seconds and this increase in the speed of rotating and handling produces a consequent increase in the tonnage output. Eccentric shafts such as crank shafts for engines can be handled without difficulty.



A 25-Ton Jib Crane Equipped with Billet Rotating Mechanism. Built by the Johnston & Jennings Company, Cleveland, Ohio.

As will be noticed from the accompanying illustration, the mechanism, while rigidly and strongly designed to absorb shocks without any damage to itself, is at the same time universal in operation and all the customary movements obtained with an ordinary crane are not interfered with. The sling chain can be swiveled entirely around and all the joints in the hook block are universal. Work can be handled close to the hammer or with the carriage at any point on the jib. The motor is protected so that none of the shocks due to hammering are transmitted to it, and if, on account of jamming, the sling chain will not rotate, no damage will be done to the motor.

Steel castings or forgings are employed for all parts, including the gears, which have cut teeth. Bronze-bushed and self-lubricating bearings are provided, and a special type of lubricant capable of withstanding the heat from the billet is used. A sprocket wheel is employed to drive the sling chain positively, and if it is desired to operate the sling chain wheel by hand the removal of a small pin disconnects the wheel.

As illustrated, the device is intended for operation by an electric motor, but it can be easily adapted for operation by either steam or compressed air. The craneman can operate the device from the base of the crane or the controllers for the crane and the billet rotator can be placed near the hammerman and operated by him. The device is shown fitted to a 25-ton jib crane, but it can be furnished for either jib or traveling cranes of any capacity.

A New Prentice Automatic Turret Machine

A Five-Spindle Machine with Two Tapping Spindles

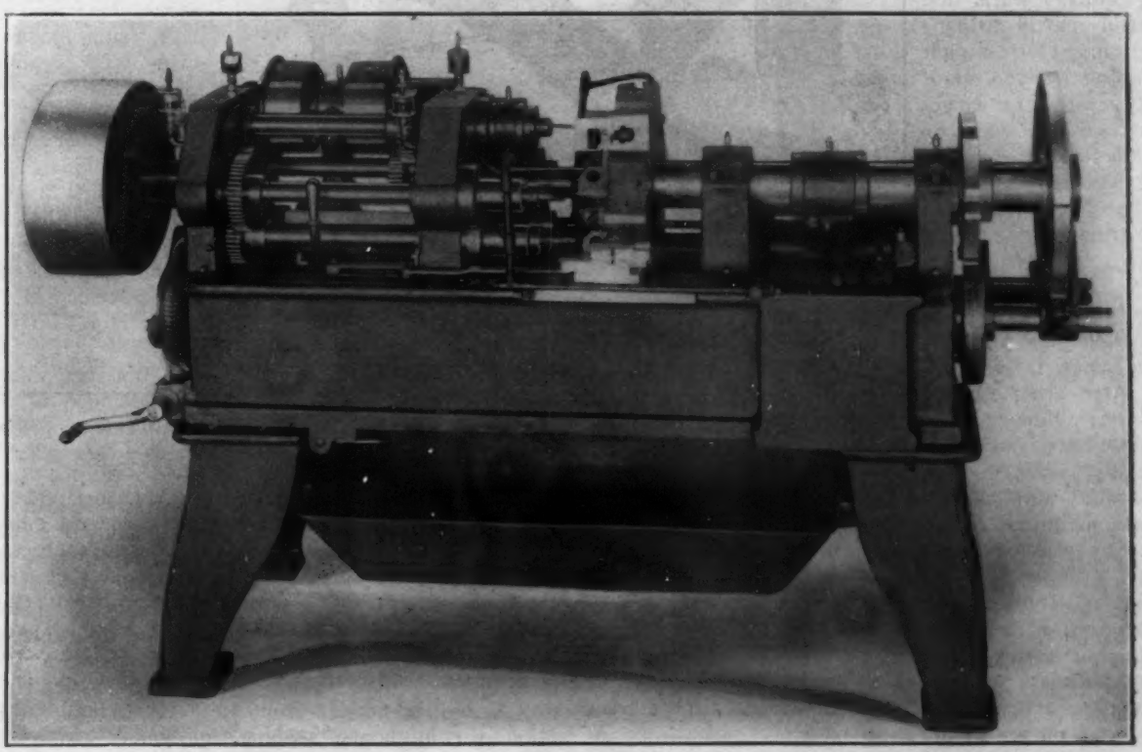
A modified form of the standard five-spindle automatic turret machine built by Geo. G. Prentice & Co., Inc., New Haven, Conn., is arranged especially for drilling, tapping, &c., solid castings, forgings and similar work requiring two taps—one undersize for roughing out and the other for finishing full size. By this method two light cuts are taken and the breakage of taps of, say, ⅜ in. and smaller, due to clogging of chips when using one tap, is overcome.

The tapping mechanism consists of a pair of friction pulleys, one each for forward and reverse drive, automatically tripped after tapping the required number of threads. The tapping is done in the fourth and fifth spindles, both being yoked and geared together and driven by one set of friction pulleys. When starting a new job the roughing tap is run through the hole, then the finishing tap is started a few threads by hand into the thread to get the lead. When the collets are tightened both taps will maintain the same lead.

The machine illustrated has a six-section chuck or work holder. Five pieces are operated upon simultaneously in this machine while the operator is removing and inserting work at the sixth section of the chuck. The five spindles may be equipped with any arrangement of tools, including drills, reamers, counterborers, facers, box tools, taps, &c. The engraving shows the machine equipped with tools and work holders for drilling, counterboring and tapping the binder screw hole in automobile clutch shifter fork forgings.

The principle of this machine is the same as other Prentice single-head automatics. The chuck is automatically advanced toward the revolving spindles by a cam on a large drum inside of the bed. There is also a return cam to draw the chuck away from the tools at the completion of the operations. The camming is timed so that the chuck is automatically indexed to the succeeding operation as soon as the longest operation has been completed. A new feature being applied to Prentice automatics is a differential feed mechanism for speeding up the indexing time of the chuck. By this means the production is increased about 30 per cent. This is an additional saving of time over that already accomplished by these machines as compared with the single-spindle hand or automatic turret machine. The great saving of time in this machine is due to the fact that all the operations on any piece are finished complete within the cutting time of the longest operation only. A further reduction in time is made on the class of work requiring the drilling of long holes by drilling half the length in one spindle and the remainder in the succeeding spindle; thus a 2-in. depth of hole could be drilled the entire length, reamed, faced, tapped, &c., in the time that would ordinarily be consumed in simply drilling half the length of hole.

The net weight of this machine with the counter-shaft is about 3000 lb. It has ample power to drill and tap ⅝-in holes, although the class of work requiring the double tapping arrangement is generally ⅜ in. and smaller.



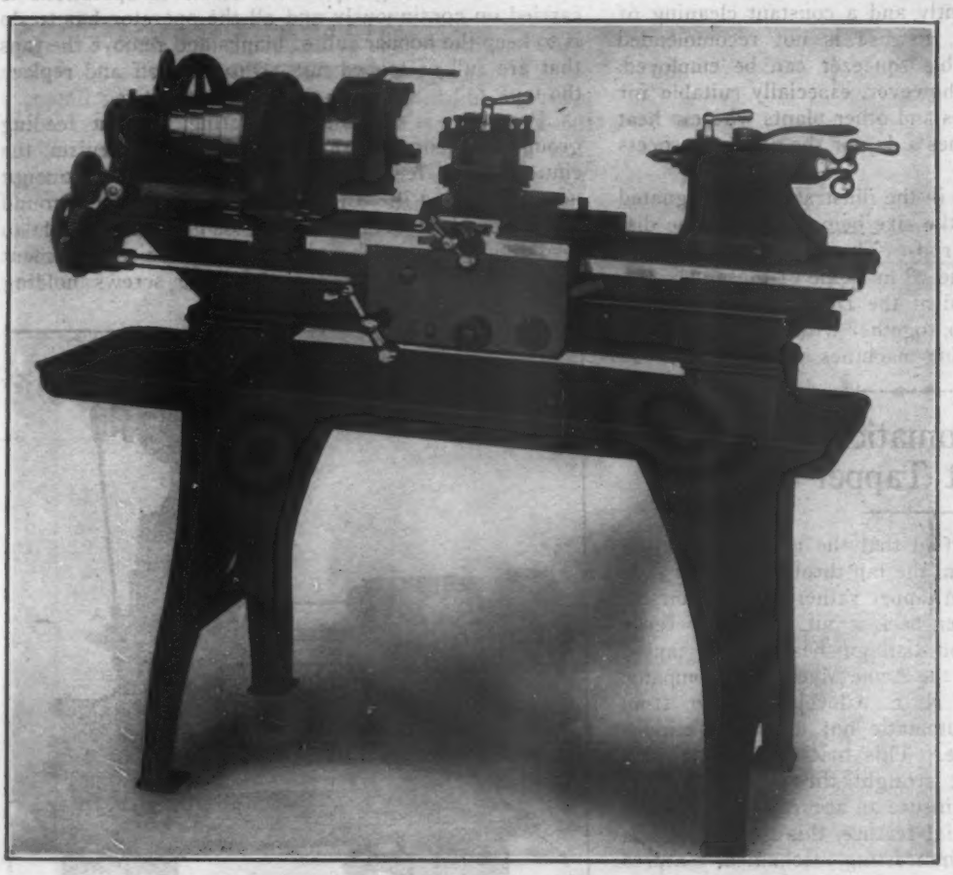
A Five-Spindle Automatic Turret Machine with Two Tapping Spindles, Built by George G. Prentice & Co., New Haven, Conn.

The International Harvester Company, Chicago, has begun the erection of a plant near its McCormick Works in that city for the manufacture of farm tractors or gasoline traction engines. The company has been engaged in the manufacture of these machines for several years, the gasoline engines being built at the company's engine factory at Milwaukee, while the trucks have been built at Akron, Ohio, and the complete machines assembled at the latter place. The building of the trucks and the work of assembling will be carried on at the new Chicago plant, but the engines proper will continue to be made at the Milwaukee plant.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, is raising the roof 8 ft. on the building containing its sheet mills to provide better ventilation and to allow air cooling apparatus to be installed, which will be done in the near future. The work is being done by the McClintic-Marshall Construction Company, Pittsburgh.

New Attachments for Star Lathes

In the accompanying illustration are shown two new attachments for use on the 9-in. and 11-in. Star lathes built by the Seneca Falls Mfg. Company, 255 Water street, Seneca Falls, N. Y. One of these is a combined carriage turret and turret tool post, which is mounted on the cross slide in place of a compound rest. It has four holes for holding round shank tools, and binding screws for holding four flat tools. The tools may be fed to the work by the power cross and longitudinal feeds or the hand feeds may be used, as desired.



A Star Lathe Built by the Seneca Falls Mfg. Company, Equipped with the New Combined Carriage Turret and Turret Tool Post and the Carriage Stop.

The other attachment is a carriage stop clamped to the bed in any desired position, to limit the longitudinal travel of the carriage. It has a revolving cylinder with four adjustable stop rods; the cylinder is revolved by hand and is held in position by a detent spring and ball.

These two attachments may be used singly or together and are declared to be effective in saving time when facing and turning duplicate pieces; they save measuring for each piece and each operation, and it is claimed insure uniform dimensions.

The Osterberg Tin Mill to Be Enlarged.—The Osterberg Tin Plate Company, Waynesburg, Pa., manufacturer of bright coke plates for canning purposes, is operating every department in full, from the mill to the tin house. A 10-ton Morgan electric traveling crane was recently installed, and H. Osterberg, the general manager, states that his company contemplates extensive enlargements to the plant later in the year. A 40 x 90 ft. addition is to be built to the main building, making it 90 x 390 ft.; two more hot mills are to be built, together with additional boilers, heating furnaces, &c. The company now operates four hot mills and for the purpose of getting in line to secure business which it could not accept this year has made its plans to increase its rolling capacity 50 per cent.

The Farwell Wall Type Squeezer

The number of molding machines manufactured by the Adams Company, Dubuque, Iowa, has been increased to 72 various styles and sizes by the addition of the Farwell wall bracket squeezer shown in the accompanying illustration. This style of bracket was originally designed by K. J. Carroll, superintendent of the National Malleable Castings Company's foundry at Cleveland. This company purchased a number of Farwell squeezers without legs, and made its own wall brackets. Since that time the Adams Company has had a number of calls for a machine of this type, and it has recently decided to add this style to the line which was illustrated and described in *The Iron Age* May 5, 1910.

This machine is not intended to take the place of the stationary squeezer or any of the other types, as it is a special design suitable only for certain conditions. Its principal advantage is that it occupies very little floor space, and where the floors are crowded its use makes it possible to put up one or two more rows of molds. The proper machine for most foundries is the ordinary portable squeezer, which can be moved three or four times a day, and thus saves a considerable amount of work in carrying molds and moving sand.

The New Wall Type Farwell Squeezer Built by the Adams Company, Dubuque, Iowa.

This new machine would of course be equally unsuitable for use on long floors, where a considerable space is covered with molds and the day's work is accomplished at one pour. Where the floors are exceedingly narrow the broad gauge type of portable machine straddling the sand heap can be used, but as this machine must be moved frequently and a constant cleaning of the floor is necessary, its use is not recommended where a regular portable squeezer can be employed. This new machine is, however, especially suitable for malleable iron foundries and other plants where a heat is drawn off several times a day or the pouring process is continuous.

The machine shown in the illustration is designated as the 30-in. machine, the size being rated by the distance between the side rods. Three other sizes will be built—namely, 24, 34 and 38 in. One of these new machines will be exhibited at the Detroit Foundrymen's Convention June 6 to 10, together with 27 other models of this company's molding machines.

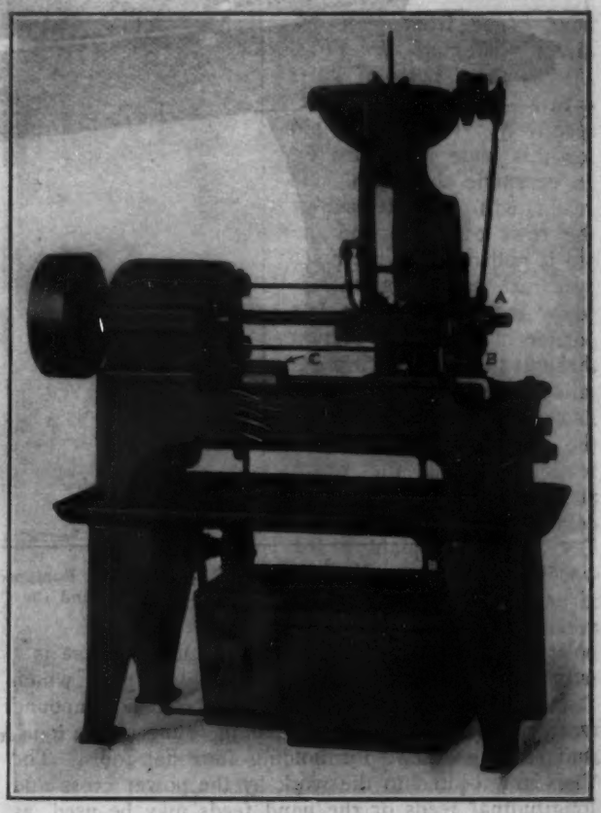
The Acme Automatic Nonreversing Nut Tapper

It is generally admitted that the more satisfactory way to tap nuts is to run the tap through the nut as is done in a hand operated tapper rather than to run the tap into the nut and then back it out. This difference in the mode of operation distinguishes the new tapper recently brought out by the Acme Machinery Company, 4533 St. Clair avenue, N. E., Cleveland, Ohio, from nearly all the other automatic nut tapping machines usually offered for sale. This machine uses a long shank tap and runs it straight through the nut—a feature which is said to insure an accurately cut thread. In addition to that special feature, this nut tapper has several other new and interesting mechanical features which make for rapid production and simplicity, durability and ease of operation.

The nuts to be tapped are put into the hopper shown at the top of the machine in the accompanying illustration and are fed to the nut chute automatically by a set of fingers. At the bottom of this chute is a reciprocating nut feeding slide A which is normally pressed forward by a spring against a revolving tap. This slide is moved back by a cam and as soon as it is released from the cam the spring returns it toward the tap. In its movement the slide takes the lowest nut from the chute and presses it on the tap. The number of times that this slide moves forward and back without stopping is controlled by the number of nuts that can be held on the shank of the tap. For example, the tap shank will hold 26 $\frac{1}{16}$-in. nuts. The slide will make these feeding movements so rapidly that two or three nuts will be passing over the thread of the tap at the same time, and when 26 movements have been made a dog B drops into place and checks the movement of the slide. This stoppage in the movement of the slide is only momentary, but it is long enough so that all of the nuts can run from the threaded portion to the shank of the tap so that it may pass down through the slide freely, which it could not do if any pieces were still being tapped.

The tap operating mechanism consists of a disk which carries three taps in sockets spaced at equal distances around its circumference and the tap that is opposite the feeding mechanism is the only one that is running, the other two being stationary. When the tap that is opposite the feeding mechanism has its shank completely filled the friction clutch C engages and turns the disk and the tap holding sockets so that the tap whose shank is filled with finished pieces turns down to the lowest position and stops running. At the same time the tap which was formerly in the uppermost position comes around in front of the nut feeding mechanism and immediately begins to run. At the instant that the position of the taps is changed, the dog B releases the slide. The spring immediately carries the nut feeding slide forward and in its movement it takes the bottom nut from the feeding chute and presses it on the revolving tap. This series of operations is carried on continuously and all the operator has to do is to keep the hopper full of blanks and remove the taps that are full of tapped nuts, slip them off and replace the taps.

Provision is made for adjusting the nut feeding group comprising the hopper with its mechanism, the chute and the feeding slide toward the tap an amount not exceeding 3 in. In this way as the taps are ground and become shorter it is still possible for the slide to feed the blanks to them. In making this adjustment it is simply necessary to loosen the screws holding



A New Automatic Nonreversing Nut Tapping Machine Built by the Acme Machinery Company, Cleveland, Ohio.

this group and move the slide toward the tap because all the mechanism which has to change its position is carried on feathers and moves freely with the feeding group.

Three sizes of machine are built and the maximum sizes of nuts handled by each are ¼, ½, and 1 in., respectively.

A Colonial Crucible Steel Furnace Record.—The Colonial Steel Company, Pittsburgh, Pa., furnishes the following report of the remarkable record made by its furnace No. 2. This furnace made its first heat September 14, 1908, and its last heat May 4, 1910, having been in operation for a period of one year, seven months and twenty days; number of heats made, 2561; amount of steel melted, 6,644,640 lb., both low and high carbon tool steel and alloy steels. During this period the furnace was not melting for about 10 weeks, when the melting department was shut down, but the furnace was kept warm continuously and never allowed to get cold. The top row of brick on the front of the furnace was replaced twice; the back of the furnace has never been replaced. This is a 24-pot Siemens furnace and is worked exclusively on artificial gas.

The No. 4 Hendey Universal Milling Machine

Interesting Details of a New Dividing Head and Other Mechanisms

The new No. 4 geared-spindle universal milling machine recently brought out by the Hendey Machine Company, Torrington, Conn., has as an important feature a dividing head of new design. Figs. 1 and 3 give two views of the complete machine and Fig. 2 shows the head. The frame furnishes annular bearings for side plates, which in turn serve as trunnions for carrying the center block of the head. The front plate for direct indexing *h* (Fig. 4) has three rows of holes with 24, 30 and 36 holes, respectively. The plunger pin for this plate is carried on an eccentric shaft, which is graduated to indicate each of the rows of holes, and the pin is pulled out of the holes by a rack and pinion operated by the lever *i*. The left portion of Fig. 4 is a section through the head, giving details of the plunger pin and its operating mechanism, and the right part is a vertical section showing the worm and worm gear and other details of the mechanism. Only one side plate *a* for worm wheel indexing is furnished, the plate being reversible, with nine rows of holes on each side running from 15 to 49 holes per row. The indexing crank *b* has a free grip, which rotates on a shaft when making spacings. The index pin has a snap catch to hold it free from the plate when indexing. The worm runs in an oil bath and is clamped by the handle *e*. It is thrown in and out of mesh with the worm wheel by the hand nut *f*, and the depth of engagement between the worm and the worm wheel is regulated by the cone-point stop *g*, which can be adjusted for wear of the worm.

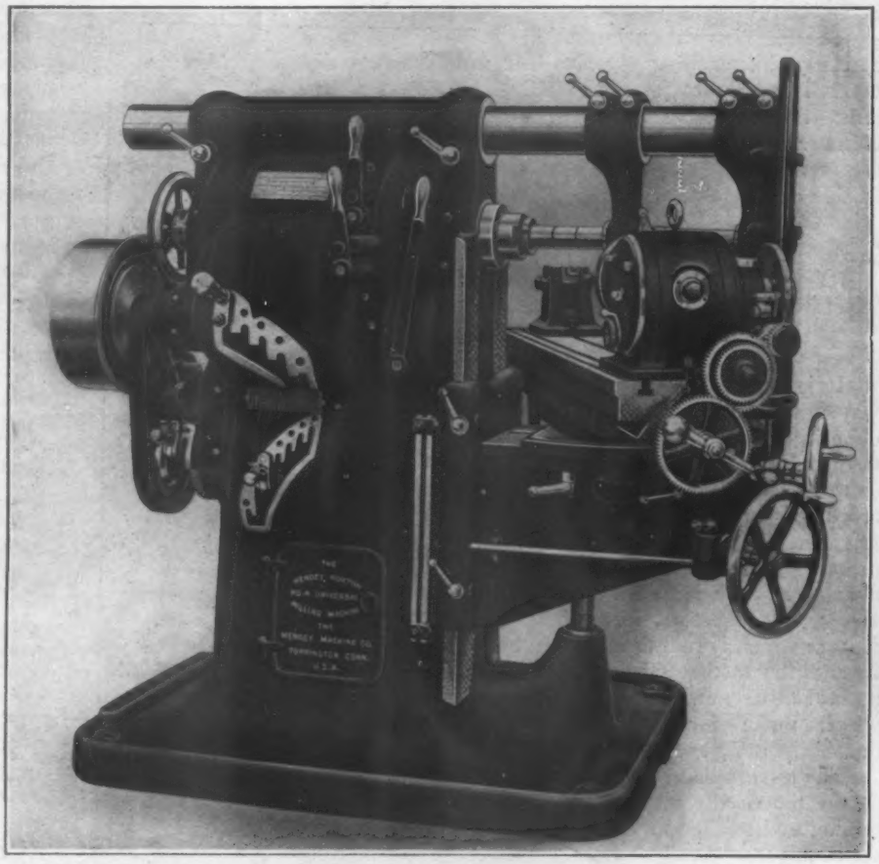


Fig. 1.—The No. 4 Universal Milling Machine Built by the Hendey Machine Company, Torrington, Conn.

Three stub bolts, *c*, hold the side cover in place. The spindle has a taper fit in its bearings and is adjusted to eliminate play by a spanner nut at the small end. To lock the spindle there is a plug, *j*, bearing against the washer under the spanner, and which is thrust outward to clamp the spindle by an eccentric actuated by the lever *d*. The center is secured in the spindle bore by the drawing-in bolt *k*.

The machine is of the constant speed belt-driven type. The aim of the designer was to provide ample power and range of spindle speeds and feeds and at

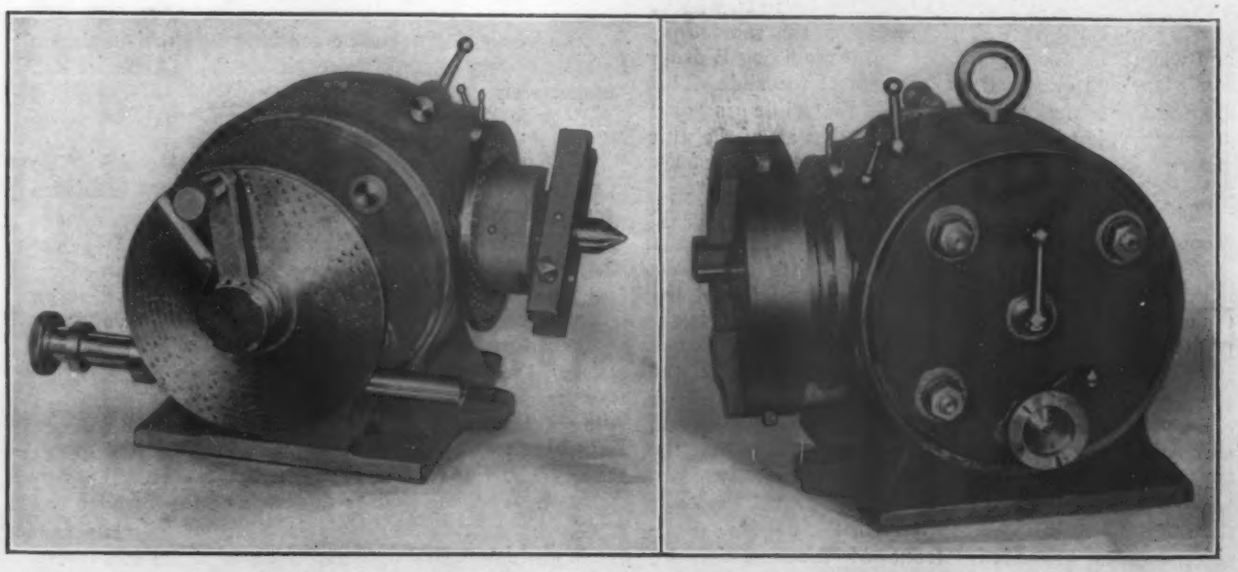


Fig. 2.—Two Views of the New Dividing Head on the Hendey Milling Machine.

the same time to keep the mechanism free from complicated construction. The gearing for speeds and feeds is essentially that which the Hendey company has widely introduced in its engine lathes, and which was described in *The Iron Age* April 30, 1908. The driving shaft pulley engages a shaft through an expanding ring clutch, which is controlled by a lever located near the face of the column, a device that facilitates making the five speed changes in the gear cone on the spindle. The double back gears are in constant mesh with their corresponding gears on the spindle and are engaged in the drive by a positive toothed clutch, which combines with the gear cone to give 15 spindle speeds in direct progression. The back gear clutch and the clutch on the spindle for stopping and starting the mechanism are controlled by the two upper levers shown in Fig. 1. The main spindle has taper journals, which run in annular bearings, fitted with ring oilers.

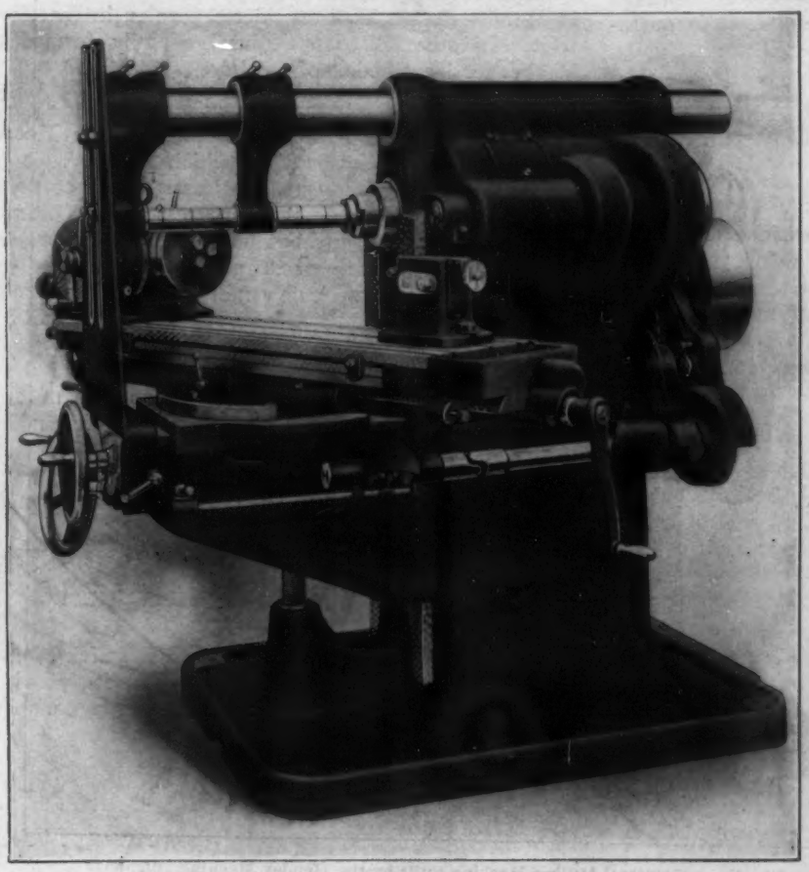


Fig. 3.—Another View of the No. 4 Hendey Universal Milling Machine.

The thrust is taken on the front bearings and the journals have independent adjustment in either bearing. The upper housings for the overhanging arm are annular in form and the arm is ground to fit the sleeve and is clamped by self-centering binders, which do not disturb the alignment of the arm after setting. The table has three ¾-in. tee slots and is fitted to the saddle with tapered gib for taking up the wear. It has a bearing on the shoulders of the saddle, and is thus supported, so that work can be machined clear to the edge without rocking. The feeds, 21 in number, are positively driven through chain and sprockets, and are obtained by shifting levers in compound gear boxes. They have a range of ¼ in. to 25 in. of travel per minute. These feeds are all automatic and can be operated simultaneously and reversed while the machine is in motion. The sprocket on the feed shaft runs between friction disks, which are adjustable for varying power requirements. The dimensions and specifications of the machine are as follows:

Taper hole in end of spindle, B. & S.	No. 12
Straight hole through spindle, in.	1⅝
Diameter of driving pulley, inches	16
Width of double belt required, in.	5
Speed of driving pulley, revolutions per minute	350
Range of spindle speeds through double back gears	12 to 106
Range of spindle speeds through geared cone	134 to 350
Table overall, inches	60½ x 15
Working surface of table, in.	55½ x 15
Longitudinal travel, automatic, in.	35
Transverse travel, automatic, in.	12
Vertical travel below center, automatic, inches	20
Swing of index centers, inches	15
Distance between centers, inches	31
Vise opening, inches	4⅝
Dimensions of vise jaws, swivel vise, inches	7¼ x 2
Universal chuck furnished	9 in., 3 jaw
Arbor furnished, inches	1¼
Countershaft pulleys, inches	20 x 5½
Speed of countershaft, revolutions per minute	310
Floor space required, inches	108 x 117
Net weight of machine, pounds	6,900
Domestic shipping weight, approximate, pounds	7,600
Foreign shipping weight, boxed, approximate, pounds	7,900

The equipment regularly furnished with this machine includes a countershaft, with friction pulleys and all the necessary accessories for a tool of this character.

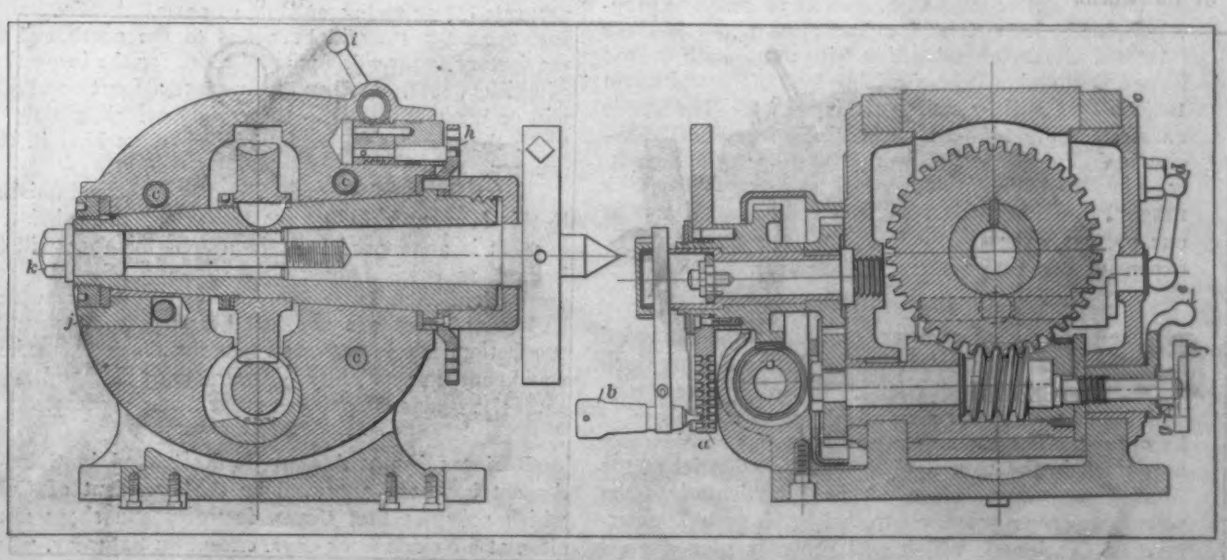


Fig. 4.—Longitudinal and Lateral Sectional Elevations of the Dividing Head.

S. DIESCHER & SONS, Mechanical and Civil Engineers, PITTSBURGH, Pa.

Lake Superior Iron Mines

Coleraine District Concentrates—A New Vermillion Range Shipper

DULUTH, MINN., May 27, 1910.—The great concentrating plant which the United States Steel Corporation is building on the shores of Trout Lake, at Coleraine, Minn., for the purpose of treating the so-called sandy ores of the western Mesaba has finally gone into commission in part. It was described in *The Iron Age* of January 6, 1910, page 48. Two units are in operation. It was originally planned to operate 10 units, and this may be done eventually, but not more than five units will be completed this year. Each unit has a capacity of 1000 tons of concentrates per day of 10 hr.

A notable work of improvement carried on by the Steel Corporation in the central portion of the Mesaba range is the establishment of new headquarters in the Hibbing district. The laboratory is 60 x 72 ft., two stories and of brick, with stone trimmings. It is the largest on the ranges. The office building is 60 x 70 ft. The first floor will be occupied by the grading department and the clerical force, and the second floor by the engineering department and the superintendent's offices. At the rear of the office is a "dry," 26 x 84 ft., fitted with every possible convenience for the men, including shower baths. The machine shop consists of a main section with two wings. It is 115 x 206 ft. The locomotive department is 40 x 136 ft., the boiler house 40 x 50 ft., and the engine house 33 x 46 ft. Construction work is well advanced, but the shops will not be ready for occupancy before the beginning of 1911. The other buildings will be occupied shortly.

New Cuyuna and Vermillion Range Shippers

The Rogers-Brown Iron Company will put the new Cuyuna range of Minnesota on the shipping list this season, when it sends out its first ore from the Kennedy mine at Rabbit Lake. The Cuyuna is proving a more valuable field than many mining men have disposed to concede. About 50 drills are engaged in exploratory work. Much ore has been shown up and in some holes the mineral is of high grade, though it is yet too early to class the district as an important source of ore supply. The ore shipped this year will be sent to the Ashland docks by the Soo Line. Next season the Soo Line will be prepared to handle the ore from a dock on St. Louis Bay, at the head of Lake Superior, the construction of which will be under way before the close of this year.

A new shipper will be added to the Vermillion range list this season for the first time in 22 years. The property is the Section 30, or Shagawa mine of the St. Clair interests. Railroad connection with the Duluth & Iron Range Railroad will be available by June 1 and about 100,000 tons will be sent out this season. The ore is an exceedingly high-grade Bessemer hematite. Success in finding ore in the Section 30 property has greatly stimulated exploratory work on the Vermillion range. Ore has been found on some tracts, and at one property, the North American, the sinking of an expensive concrete shaft is in progress.

On Michigan Ranges

The Chicago & Northwestern Railroad has awarded a contract for the construction of three miles of track in the Michigamme district of the Marquette range which will tap several new mining properties about to be opened. The same company is laying considerable new track in the Iron River-Stambaugh district of the Menominee range. One spur is being built into the new Zimmerman mine, controlled by Eugene Zimmerman of Cincinnati, which will probably give a good account of itself this season. Another new track is being extended to Pickands, Mather & Co.'s Swanson property at Stambaugh. The Swanson is in course of development, but will ship no ore this year.

A new exploration on the Menominee range has been started by a pool in which A. E. Guensburg of Menominee and Henry R. Armstrong of Green Bay, Wis., are principally interested. The John Mattson farm, south of Iron Mountain, has been taken under option and will be prospected thoroughly.

At the Independent Iron Company's Spencer exploration at Iron Mountain a larger pump has been installed. The shaft has reached a depth of about 200 ft. A sandstone capping has been encountered in the work, but sandstone has been considered foreign in that district. In other districts it has generally formed a blanket for large bodies of good ore.

Moose Mountain

A report issued to the stockholders of the Moose Mountain Mining Company, in which John W. Gates and associates are interested, indicates that operations on a large scale will soon be in progress at this Ontario property. The company has made a contract for the complete electrification of its plant, the power to be transmitted 31 miles. A new mill for crushing, sizing and separating the ore is nearly completed and will be in full operation by June 1. This plant will have a daily capacity of 1,000 tons. Further diamond drill work has shown approximately 1,000,000 tons of ore of shipping grade in the No. 1 deposit. Lifting magnets will handle broken ore. It is expected that this system will justify itself by a large saving in mining cost. The output for the present season is expected to be about 100,000 tons of ore.

Jeffery Automobile Factory Enlargements

Plans just made public by Charles T. Jeffery, head of Thomas B. Jeffery & Co., Kenosha, Wis., provide for several large additions to the Rambler automobile factory, which now occupies a large portion of the western section of the city. Ground has already been broken for three of these additions. The most important building to be erected will be a new power plant, by which 1500 hp. will be added to the present boiler capacity and 1000 hp. to the present engine capacity. A feature of the new power plant will be a complete equipment of automatic stokers, to be fed by an automatic coal handling apparatus, which will carry the coal direct from the cars in which it is received.

An addition of 100 x 300 ft. will be made to the machine shop to provide room for more machinery for the careful machining of important parts. An addition of 150 x 257 ft. will be made to the motor assembling department to provide more room for the accurate fitting and assembling of parts. A third building, 200 x 257 ft., will be added to the north end of the factory to provide for more room for the inspection of finished cars. During the summer a fourth addition will be made to the drop forge shop, which is claimed to be the most completely equipped of its kind in the country.

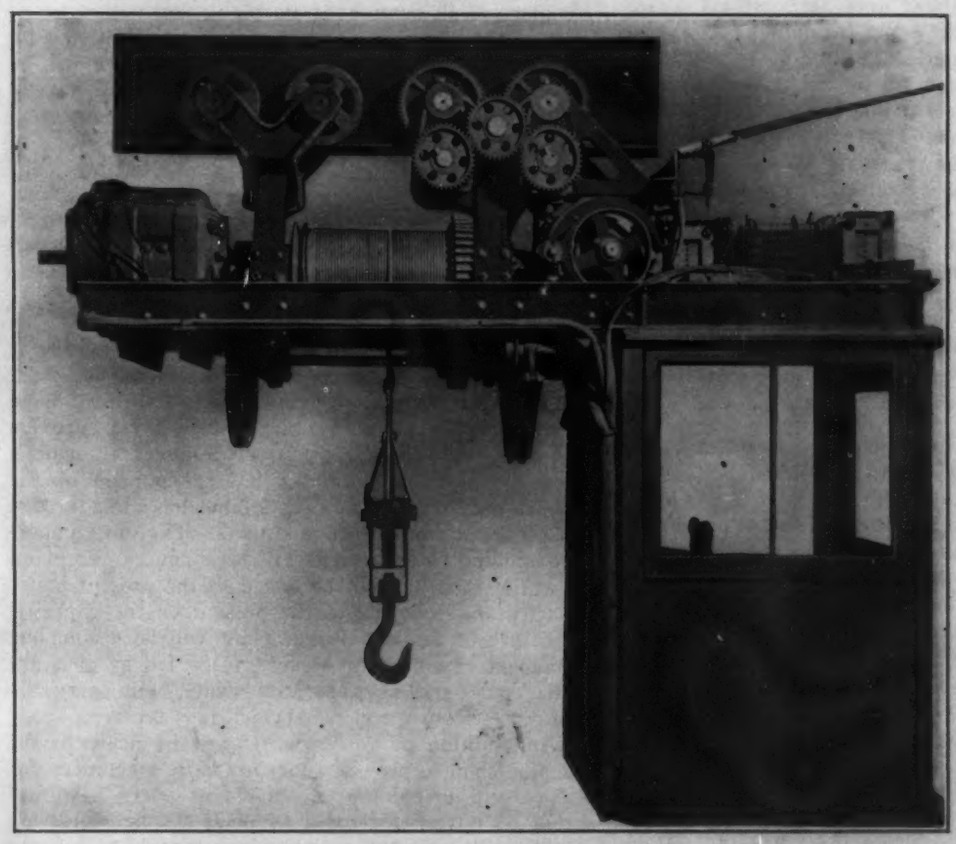
Every part of the Rambler is now made and finished in this factory, including the bodies and the upholstering. It is announced that the output for 1911 will be limited, as usual, only 2500 cars being scheduled for production. The large additions to the factory which have been made are not for the purpose of quantity production, but to provide room for the most modern equipment that will insure accuracy, quality and more careful workmanship in manufacturing processes.

Business Hours Are to Be Restricted in Cuba.—An act has been approved by the President of Cuba which provides that stores, factories and shops must close at 6 o'clock week days, except on Saturday, when they may remain open until 10, and must remain closed on Sundays and legal holidays.

The Heyl & Patterson Monorail Trolley Hoist

A new design of monorail trolley hoist for distributing coal to the boxes back of the puddling furnaces and removing the ash and cinder from the furnaces themseleves has been recently installed at the plant of the A. M. Byers Company, Girard, Ohio, by Heyl & Patterson, Inc., Pittsburgh, Pa. The trolley has a speed of 350 ft. per min. and carries a two-ton bucket, which is hoisted at the rate of 50 ft. per min.

The trolley frame is hung from two cast steel trucks by two steel forged straps resting on single ball bearings. The advantage of this type of construction is that the trucks are independent of each other and that the trolley can run round a curve having a radius as small as 11 ft. Each truck has four 10-in. cast steel track wheels, set at such an angle with the truck as to be perpendicular to the slope of the flange of the 15-in. I-beam on which they run; this reduces the wear on both the beam and the wheels. One truck is driven through spur and bevel gears by a 7½-hp. type K motor



A Monorail Trolley Hoist for Coal Handling Installed for the A. M. Byers Company by Heyl & Patterson, Inc., Pittsburgh, Pa.

made by the Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. To control the speed a band brake operated by a foot treadle in the cab is provided on the motor armature shaft.

The hoist is operated by an 11-hp. type K Westinghouse motor, being connected to the 12-in. drum by spur gears. The countershaft has a band brake to control the speed at which the bucket is lowered and to keep it stationary when the power circuit is open. Rheostatic controllers are used to operate both the hoisting and traveling motors.

Turbo-Alternators.—Calling attention to the development of turbo-alternators by the Crocker-Wheeler Company, Ampere, N. J., is the announcement of the sale of two 3530 kva., 1500 rev. per min., 25 cycle, three-phase, 2300-volt, alternating current turbo-generators to the Illinois Steel Company. They are to be installed by the Ball & Wood Company at the South Works in Chicago. Excitation will be effected by two 35- kw., 125-volt Crocker-Wheeler generators. These exciters will be direct connected to the end of the generator shafts, and the armature of each is to be connected electrically with the turbo-generator field without any regulating resistance whatever in its circuit. The regulation of the alternators will be brought about altogether by adjusting the strength of the exciter fields. There will be no disconnecting switch between the armature of the exciter and the field of the generator.

The Mining Machinery Outlook

The following statement has been received from one who has had occasion to investigate conditions in the mining machinery trade:

In the sale of mining machinery Mexico now offers better opportunities than any other country, owing to the enormous amount of exploitation and development which is being carried on there, chiefly with the aid of American capital. The principal producing districts of the United States and Canada, which bought heavily for a time soon after the first of the year, are not now showing the activity that was promised, except in certain sections where the necessary financial support has been forthcoming. This appears to be due to the fact that the smaller operators are hesitating to embark upon new ventures until certain conflicts now waging between important interests are definitely settled one way or another. At present, also, the future of the market for "metals of value" is sufficiently uncertain to defer many investments upon which reliance has heretofore been placed. Preliminary operations, however, such as dewatering, shaft-sinking, tunneling, &c., are being carried forward over a wider range of territory than at any time in the history of the mining industry of this country; and these will eventually lead to a very heavy demand for mining and ore reduction machinery of every description. The above, of course, takes no account of operations on the iron ranges, where there has developed independent activity that practically assures a record-breaking season.

James McNeil & Brother, Pittsburgh, builders of heavy plate construction, have received a contract for the steel work on five hot blast stoves being erected at one of the Lucy furnaces of the Carnegie Steel Company in Pittsburgh. The contract includes hot blast mains and other riveted steel pipe work in connection with the improvement. The same firm is also constructing riveted pipe for improvements to the Carnegie Steel Company's plant at Mingo Junction, Ohio.

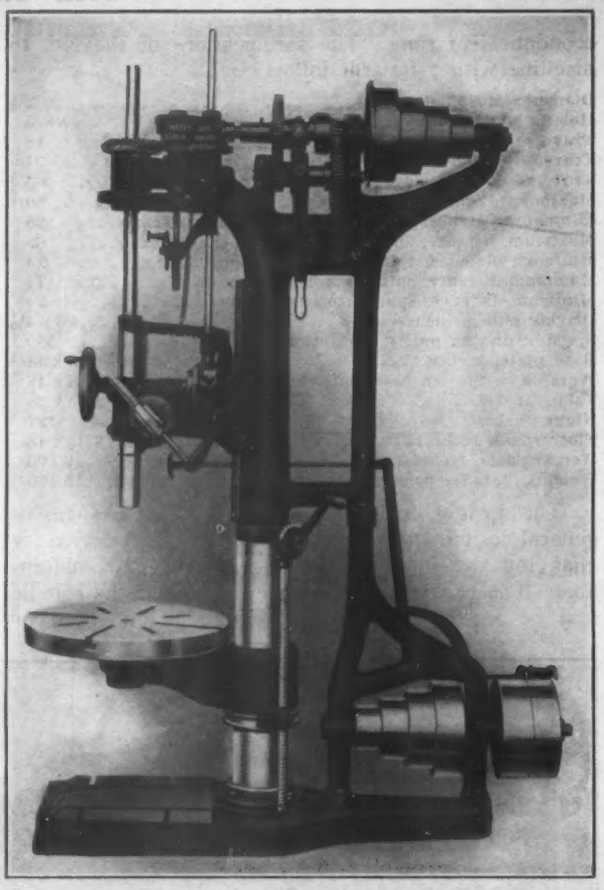
New Prentice Drills

Redesigned Radial and Upright Types with New Feed Changing Device and Depth Gauge

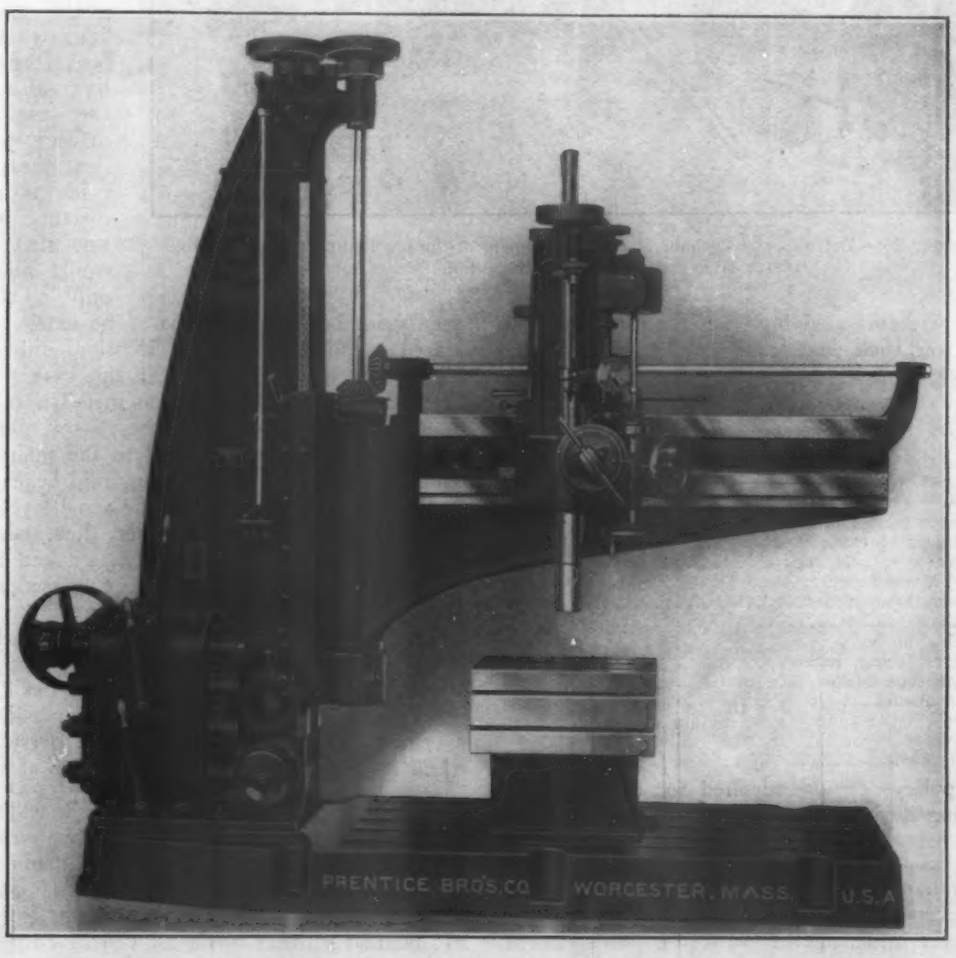
In redesigning its line of machine tools the Prentice Bros. Company, Worcester, Mass., has brought out improved types of radial drill and of vertical drilling machine, as shown in the illustrations. Both are of very heavy construction and embody various refinements of design. A salient reason for making over the radials is the increasing demand for precision work in this type of drill. It is now necessary that the machine drill and bore within very narrow limits of accuracy through a considerable radius of action, and to accomplish this in radial drill practice some complications in design and construction have been overcome. Before making the changes the company subjected the preceding type to exhaustive tests, so that full knowledge of the requirements of the new machines was obtained. The base has been made much more massive at its juncture with the columns, and the arm has been heavily ribbed to resist tortional stress. With the 7-ft. arm, as shown, the weight has been increased 2500 lb., and the other sizes are proportionately heavier.

A new feature of the machine is the feed dial seen at the right of the spindle just above the arm. The four positions for the crank handle correspond to four changes of feed. The action of the handle moves the pull spline which engages the cone of gears. A rack cut in a quill fixed on the spline is engaged by a pinion mounted on the dial crank shaft. By this arrangement the action of the crank changes the feeds, the desired position on the dial being maintained by a spring pin. The four changes of feed thus obtained are doubled by a similar device operating a second pull spline with two gear positions.

A dial depth gauge is arranged so that it can always be set to zero, whatever the position of the drill. The gear speed change device gives 16 changes. The machine is equipped with a tapping attachment and with quick return mechanism and an automatic stop motion. The roller clutch mechanism used is



The Prentice Redesigned 24-In. Upright Drill.



The Redesigned 7-Ft. Radial Drill Built by the Prentice Bros. Company, Worcester, Mass.

economical of time. The specifications of the No. 10 machine with 7-ft. arm follow:

Diameter of spindle, inches	2½
Hole in spindle, Morse taper	No. 5
Traverse of spindle, inches	18
Traverse of saddle, inches	37
Traverse of head, inches	55
Maximum distance, column to spindle center, inches	80
Minimum distance, column to spindle center, inches	25
Maximum distance, spindle to trunnion, inches	69
Minimum distance, spindle to trunnion, inches	14
Maximum distance, spindle to base, inches	75
Minimum distance, spindle to base, inches	20
Driving pulley, inches	16 x 4½
Speed of driving pulley, revolutions per minute	350
Base plate, inches	123 x 48
Working surface on base plate, inches	88 x 48
Table, inches	27 x 23 x 24
Hight, inches	127
Floor space, inches	137½ x 48
Weight (net), pounds	13,100
Weight (boxed), pounds	15,100

The upright drill has equally important changes in general design, and is equipped with the dial device for changing the feed, four changes being thus obtainable. The back gears are arranged so that the spindle may be instantly changed from high to low speed, or vice versa, without stopping the machine, by the operation of the back gear lever. With the four step cone and back gears eight speeds are to be had. The machine has the Prentice quick return and stop motions. The specifications for the 24-in. machine follow:

Distance center of spindle to column, inches	12⅛
Maximum distance from spindle to base, inches	49⅝
Maximum distance from spindle to table, inches	36⅛
Vertical adjustment of table, inches	16
Vertical traverse of spindle, inches	11
Hole in spindle, Morse taper	No. 4
Total hight of machine, inches	91 11/16
Diameter of spindle, inches	1⅝
Diameter of table, inches	23
Largest diameter of cone, inches	11⅝
Width of belt on cone, inches	2¾
Driving pulleys, inches	11 x 3½
Speed of bottom shaft, revolutions per minute	300
Net weight, pounds	1,500
Boxed weight, pounds	1,920

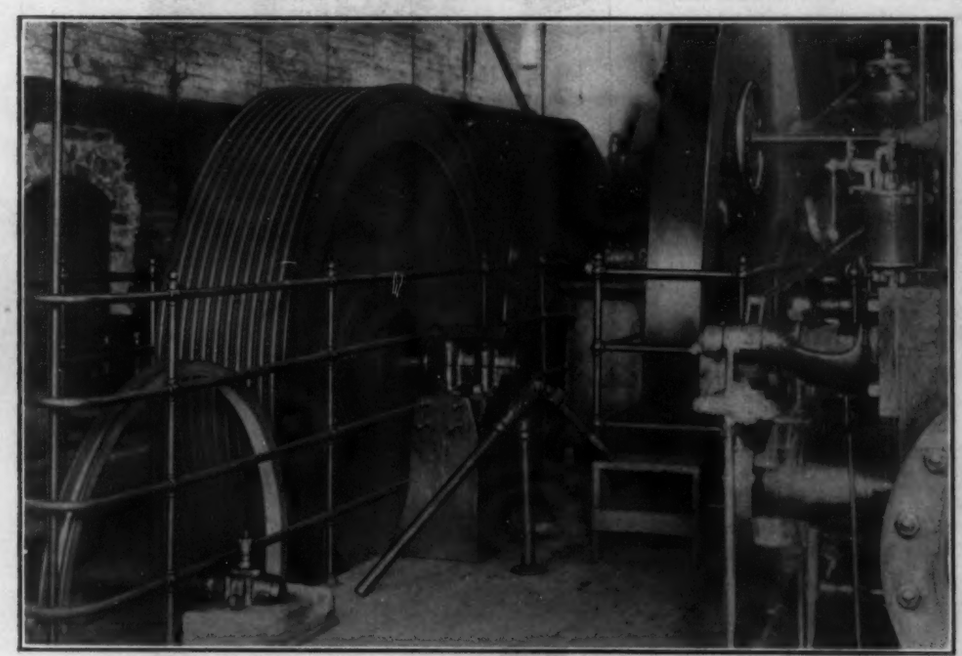
Friction pulleys can be supplied for tapping or a special tapping device can be attached to the spindle if desired.

The Carnahan Tin Plate & Sheet Company, which operates a seven-mill tin plate plant at Canton, Ohio, is adding another mill, together with two stands of cold rolls.

A Dodge Rope Drive in a Rubber Mill

At the plant of the Mechanical Rubber Company, Chicago, Ill., there is an excellent example of a short-center rope drive connecting two parallel line shafts driving the rubber working mills as installed by the Dodge Mfg. Company, Mishawaka, Ind. These mills or rolls are heavy consumers of power and are set in two parallel rows, each row receiving its power from a line shaft placed under the floor. A steam engine is generally coupled to the end of one shaft, which drives the other through spur gears of equal size, with an idler between, as the two shafts must run in the same direction. As the amount of power to be transmitted was large and the speed comparatively slow, these gears had to be heavy. The efficiency of the train was low and the idler increased the friction loss very much. In feeding the mills several chunks of rubber might be put into the different rolls simultaneously, which caused the teeth to break.

The first plant of its kind to discard gear transmission was one operated by the same company in Cleveland, Ohio, where in 1903 the Dodge Mfg. Company installed a rope drive, and since that time a number of similar drives have been installed in other rubber factories. Where the rope drive has replaced the gears it has easily fitted into the space formerly occupied by the gears, as the intermediate gear has been eliminated. This has also permitted the use of larger drivers, so that the two sheaves can be made as large as the distance between the line shaft centers would allow, leaving only a slight clearance space between the rims. The tension carriage is placed in some convenient location, either outdoors, underneath the shafts or, as in this case, overhead.



A Short Center Rope Drive in the Mechanical Rubber Company's Chicago Plant, Installed by the Dodge Mfg. Company, Mishawaka, Ind.

The engine employed in this installation is a 26 x 48 in. Corliss model, operating at 78 rev. per min., and has its shaft directly coupled to the main line shaft, which extends into the adjoining mill beneath the floor level. The other shaft is at the same level and is 109 in. away. The engine runs over, thus making the top ropes the drivers and the slack is taken from below over idlers to a tension carriage housed in the roof of the engine room. A comparison of the size of the sheaves and the distance between them with the 18-ft. flywheel of the engine will show the compactness of the drive. The nominal capacity of the drive is 275 hp., but there is ample provision for taking care of overloads. The photograph of the drive was taken while it was running at full speed.

The West Penn Steel Company, Brackenridge, Pa., near Pittsburgh, has just placed its two new additional mills in operation. The company manufactures all grades of open hearth steel sheets, from one-pass cold rolled or blue annealed to fine finishes for automobile and metal furniture work, as well as electrical sheets. It reports business very good.

New Tools and Appliances

An Expanding Metal Drill.—C. H. Phillips, 689 Massachusetts avenue, Cambridge, Mass., has invented a tool for boring undercut holes in bearing boxes or other surfaces to be lined with babbitt metal for locking the metal securely and permanently in place. The hole is first started with an ordinary drill and bored to 3-16 in. Then this new tool is inserted, together with a special socket, which permits the drill to move so as to bore or cut a hole having a dovetail section. The point of the drill is guided by the hole bored by the ordinary tool.

A Universal Shear for Structural Shapes.—The Covington Machine Company, Covington, Va., is manufacturing a large universal shear for channels, angles and plates, which combines four tools in one. A coping attachment is located at one end, a plate shear at the other and two angle shears in the center of the frame. The last two operate at an angle of 45 degrees, thus securing a vertical and horizontal shearing action. The capacity of the angle shears is 15 x ¾ in. channels and 6 x 6 x 1 in. or 8 x 8 x ¾ in. angles. The plate shear has a capacity for material up to 1 in. thick. The channels or angles may be cut either square or at an angle to form miters. The four tools are driven by one 25-hp. motor mounted at the top of the machine in the center. Each shear is controlled by its own clutch so that the several operations may be carried on simultaneously, but without interfering with each other. A patent stop motion automatically throws out the clutch on each shear as the latter reaches its highest point. The coping attachment may also be used for punching and its stop mechanism is adjustable so that the plunger may be stopped at any point of its stroke. In this way the tool may be brought close to the work so that the latter can be properly adjusted.

A Large Disk Grinder.—Charles H. Besly & Co., Chicago, Ill., has recently added a tool grinder of unusual size and capacity to that line. Approximately 30 hp. is required for driving it when working at its maximum capacity. In one case, when used for facing the bottoms of electric sad or flat irons, it ground 300 surfaces in an hour and displaced 10 specially designed milling machines which were formerly used. The tables are equipped with a geared lever feed, the movement of which may be limited by an adjustable micrometer stop screw graduated to read to 0.001 in., so that work may be ground to size and duplicated. It is stated that this machine is producing commercially cast iron printers' blocks to a given size within a limit of 0.0005 in. The tables are adjustable in all directions and the lever for feeding them, while comparatively short, permits a powerful leverage to be obtained through the geared motion. A 7-in. belt is employed to drive the disk wheels, which are 26 in. in diameter, 13-16 in. thick and weigh approximately 25 lb. The weight of the grinder complete is about 4000 lb.

An Improved Pipe Wrench.—J. H. Williams & Co., 11 Richards street, Brooklyn, N. Y., has recently made quite an important improvement to its Vulcan chain pipe wrench, now making one of what is known as the Bijaw type. The change consists in making the toothed jaw-pieces double ended and reversible, so that when the teeth of one end become worn the jaws may be turned end for end and double the life secured from the wrench. Two studs or bolts through the handle prevent the spread of the jaws when in use. These studs are especially strong, and if the forward one should be broken by accident the rear one may be shifted to its place and still provide working strength sufficient to use the wrench. The Vulcan-Bijaw wrenches are made in sizes for ⅛ in. to 12 in. pipe and fittings, and with interchangeable cable or flat link chains.

Holder and Punch.—The American Die & Tool Company, Reading, Pa., has recently placed a new punch and holder on the market. The holder screws on the stub of the punching machine, and is tapered internally at the front end, two tapered half-bushings being furnished to hold the punch in place. The body of the punch is turned to fit the hole in the bushings, and an annular groove cut therein fits a similar tongue in the half-bushings.

A Fluid Speed-Changing Device.—Robert E. Newcomb, Holyoke, Mass., has invented a device for varying the speed between two axially aligned shafts and transmitting power from one shaft to the other. The variable speed drive is obtained through the skin friction of a thin film of a fluid such as castor or some other heavy oil, and is dependent upon the surface contact of this film between the driving and driven disks. This contact is controlled by the displacement of a piston, so that it is possible to secure any variation from positive drive through a cone friction clutch with which the device is equipped to rotation of the driving shaft with the driven one idle.

A Hinged Wire Belt Hook.—The Webb Hinge Belt Hook Company, Boonton, N. J., has placed on the market a new type of belt hook with a hinged joint, which consists of a series of wire hooks with long and short legs strung on a round pin. The hooks are so arranged on the pin that the long and short legs alternate on the ends of the belt when the hooks are clinched in place. The hooks are made in widths ranging from 1 to 4 in., and for any ordinary thickness of belt.

A New Molder for Car Shop Use.—The J. A. Fay & Egan Company, Cincinnati, Ohio, has recently placed on the market a molder that is particularly well adapted for use in car shops. It is a four-side molder, and is made in three sizes to take care of work, 8, 9 and 10 in. in width. The manufacturer has given special attention to the construction of the frame so that very heavy moldings may be worked without vibration. With that end in view, the frame is cast in one piece and is of very heavy construction. Four geared feed rolls are employed, the two upper ones being spur sections and the other two solid. The former are driven down, which makes it possible to attach a patent spring holding down device, which gives uniform pressure on the material, and is said to be more powerful and satisfactory than the old system of weights and levers. The construction of the bearings is such that the journals are always cool and wear is easily compensated for.

A New File for General Use.—The Carver File Works, Philadelphia, Pa., has brought out a new file for general use among mechanics. It has been given the trade name of the Delta hand utility file. The file is of the single cut type, and has large teeth with a coarse pitch, which adapts it for use on soft metals, marble, wood or similar substances.

Horizontal Drilling, Boring and Milling Machines.—The Detrick & Harvey Machine Company, Baltimore, Md., has recently added a new size to its line of horizontal drilling, boring and milling machines known as the No. 4. This has been brought out in response to a demand for a tool capable of doing heavier work than the No. 3 size, which was illustrated and described in *The Iron Age*, June 16, 1904. With this end in view the various dimensions have been increased and the parts strengthened so that the vertical travel of the saddle on the column is 96 in. This machine is intended for motor drive, a 15-hp. motor being provided for driving the spindle and a 10-hp. motor is employed for the rapid power traverse of the column on the runway and the saddle on the column.

Hobbing Fixture for Worm Gears.—The Garvin Machine Company, Spring and Varick streets, New York City, is manufacturing a worm gear hobbing fixture which will cut two worm gears at a time. While the cutting operation is being performed finished gears may be taken off and the new blanks substituted. During the cutting the worm gears rotate continually and are driven from the spindle of the machine by gearing through a positive clutch which is thrown into mesh so that either gear can be cut. The hobs are driven from the spindle by an ordinary collet chuck and are made in two pieces with the junction point in the central bearing.

Judicial Decisions of Interest to Manufacturers

COMPILED BY A. L. H. STREET

Replacing Pulley Belt.—An employee who voluntarily undertakes to replace a belt on a pulley while it is making from 100 to 200 rev. per min. assumes the risk of injury therefrom, though he may have no absolute authority to order the machinery stopped for the purpose of replacing the belt. (Alabama Supreme Court, Ritch *vs.* Kilby Frog & Switch Company, 51 Southern Reporter 377.)

Duty in Engaging Employees.—In cases where skill and capacity are essential to accomplish an undertaking it is negligence for an employer not to employ employees having such qualifications, and such negligence will render him liable for injuries to third persons occasioned thereby. (Alabama Supreme Court, Sloss-Sheffield Steel & Iron Company *vs.* Bibb, 51 Southern Reporter 345.)

Liability of Employer for Failing to Provide Safe Place for Work.—There can be no recovery for the death of an employee on the theory of failure to provide a reasonably safe place to work, where the objectionable condition arose from a defect occurring after the employee commenced work, and after control and supervision of the place had been delegated by the employer to an agent. (Alabama Supreme Court, Whitmore *vs.* Alabama Consolidated Coal & Iron Company, 51 Southern Reporter 397.)

Duty of Foundry Superintendent.—Superintendence is necessary to guard against acts of carelessness likely to happen, and if a flask lying in a walkway of a foundry, constituting a probable source of danger to employees carrying ladles of hot metal, was so obvious a danger or had remained so long that the failure of the superintendent to discover and remove it would amount to a lack of due care, the superintendent would be negligent, though the flask was left there through the negligence of the fellow workman of an employee injured thereby. (Alabama Supreme Court, Tennessee Coal, Iron & Railroad Company *vs.* Bonner, 51 Southern Reporter 145.)

Rights of Employee Regarding Machinery.—An employee need not acquaint himself with all the machinery or appliances which he does not use himself, and he may presume that his safety has been reasonably provided for, and, in general, he may use an appliance without first particularly inspecting it. (Michigan Supreme Court, Kaukola *vs.* Oliver Iron Mining Company, 124 Northwestern Reporter 591.)

Liability of Employer for Injury to Employee.—An employer is not liable for injury to an employee caused by an object projecting from the rear of a car, where it does not appear whether the car belonged to the employer or when, where or by whom the car was loaded, or that the employer knew of its condition. (Pennsylvania Supreme Court, Quigley *vs.* Standard Steel Car Company, 74 Atlantic Reporter 741.)

Liability for Injury to Inexperienced Employee.—An employer who, without instruction, directs an employee, known to have no experience in machinery, save in the operation of an electric traveling crane, to pull off the feed gears of a machine for boring steel is not free from negligence as a matter of law, where the method of doing the work, by taking hold with the fingers of a not particularly noticeable raised rim or bead on the hubs, is not very obvious to an inexperienced person. The employee, in view of his inexperience, was not guilty of contributory negligence as matter of law in taking hold of one of the slow moving gear wheels itself. (Wisconsin Supreme Court, Novak *vs.* Nordberg Mfg. Company, 124 Northwestern Reporter 282.)

Right to Discharge Employee Under Contract.—To warrant an employer in discharging one employed under a contract for a definite term, on the ground of dissatisfaction, it is immaterial whether the reasons for dissatisfaction really exist, but the employer's action must not be capricious nor mercenary, nor result from a dishonest design, and must be real and in good faith. (Wisconsin Supreme Court, Lieberman *vs.* Weil, 124 Northwestern Reporter 262.)

Duty of Employers Respecting Appliances.—An employer cannot avoid liability for injury to an employee caused by his failure to use ordinary care to furnish reasonably safe appliances by showing that all other employers in the same line of business are equally negligent. (Wisconsin Supreme Court, Winkler *vs.* Power & Mining Machinery Company, 124 Northwestern Reporter 273.)

Risk Not Assumed by Steel Works Employee.—A steel works employee does not assume the risk of dangers from an insecurely fastened furnace door, about which he is to work, where he does not know of the defective condition of the fastenings. (Alabama Supreme Court, Jones *vs.* Tennessee Coal, Iron & Railroad Company, 50 Southern Reporter 1017.)

Right of Employee to Presume Safety of Place of Work.—A workman has the right to presume that the premises of his employer are safe for the work which he is engaged to perform, unless he is chargeable with some duty of seeing to the safeness of the premises or of remedying the defects. (Alabama Supreme Court, Western Steel Car & Foundry Company *vs.* Bean, 50 Southern Reporter 1012.)

Duty of Employer Respecting Defective Machinery.—An employer need not warn employees of the danger of a machine getting out of repair, unless there is reasonable ground to anticipate that it will do so. (New York Supreme Court, Appellate Division, third department, Decora *vs.* American Carbide Company, 120 New York Supplement 655.)

Risks of Injury Not Assumed by Employee.—An employee who has been induced to commence work or continue to work by his employer's promise to remedy dangerous conditions surrounding the employment may continue work without being guilty of contributory negligence or assuming the risk of injury from such conditions, so long as he may reasonably expect the promise to be kept, unless the danger is so obvious that no reasonably prudent person would continue work under those conditions. (Nebraska Supreme Court, Benak *vs.* Paxton & Vierling Iron Works, 124 Northeastern Reporter 461.)

Risks Assumed by Steel Mill Employee.—A workman in a steel mill assumes the risk of known dangers, and such as are so obvious that knowledge of their existence is fairly to be presumed; but the law does not imply that he has notice of dangers not obvious to the senses, and arising solely out of extraordinary circumstances. (Illinois Supreme Court McCulloch *vs.* Illinois Steel Company, 90 Northeastern Reporter 664.)

Liability for Injury to Children.—The fact that an iron works company expelled boiling hot water through a conduit pipe of a city into an open space where the inhabitants of such city were accustomed to travel, and that a child there traveling fell into an open ditch, filled with such boiling water, fails to show any liability against the company. (New Jersey Court of Errors and Appeals, Ellis *vs.* Pennsylvania Iron Works Company, 74 Atlantic Reporter 667.)

Right of Employee to Wages for Lost Time.—One employed to work for stipulated weekly wages is not entitled to pay for time lost on account of illness. (Rhode Island Supreme Court, Orpin *vs.* Westmacott Gas Furnace Company, 74 Atlantic Reporter 481.)

Validity of Agreement Respecting Trade Secrets.—An agreement, based on a good consideration, preventing an employee, for a limited time, from divulging the employer's trade secrets to a competitor, is valid and enforceable. (New York Court of Appeals, McCall Company *vs.* Wright, 91 Northeastern Reporter 516.)

Contributory Negligence Bars Recovery by Employee for Injury.—An employee cannot recover for injury caused by the breaking of a beam used in moving machinery, where it does not appear that he inspected the beam as directed by his superior and where the defect would have been detected on application of the customary test. (New York Supreme Court, Appellate Division, Second Department, Holm *vs.* Empire Hardware Company, 122 New York Supplement 76.)

Employer's Duty Respecting Place of Work.—A manufacturer is not an insurer of the safety of his premises, as to his employees, not being bound to keep them absolutely safe but only to exercise reasonable care to keep them reasonably safe. A foundry company is not liable for injury to a workman caused by the fall of a pile of pig iron, though the pile was unusually high, where the iron had been standing for several months and there was nothing to suggest to an ordinarily careful person that it might fall. (Missouri Supreme Court, Bowman *vs.* American Car & Foundry Company, 125 Southwestern Reporter 1120.)

Assumption of Risk by Employee.—A workman is entitled to rely on the judgment of his superintendent, in matters affecting his safety in performing work, unless there is a danger so obvious that a prudent person would not do the work. (Alabama Supreme Court, Alabama Steel & Wire Company *vs.* Tallant, 51 Southern Reporter 835.)

Employer's Liability for Personal Injury.—An employer is not liable for injury to an employee caused by a fellow workman in using, with the injured employee's assistance, an appliance known to be out of repair. (Massachusetts Supreme Judicial Court, Ruddy *vs.* George F. Blake Mfg. Company, 91 Northeastern Reporter 310.)

Assumption of Risk of Injury by Employee.—An employee does not assume the risk of injury from the automatic starting of a machine, if the danger of such starting could not be detected on an ordinarily prudent inspection. (Massachusetts Supreme Judicial Court, Donovan *vs.* Cabot-Shawmut Company, 91 Northeastern Reporter 305.)

Duty to Warn Employee.—An employer need not warn a workman against the projection of a set-screw on a revolving shaft, if the latter knew or in using ordinary care ought to have known of its presence. (Michigan Supreme Court, MacDonald *vs.* Freeman Mfg. Company, 125 Northwestern Reporter 352.)

Risk Assumed by Employee.—An employee who is provided with an unsafe appliance assumes the risk of injury thereby by continuing to use it, where, by using ordinary observation, he can ascertain the danger. (Iowa Supreme Court, Paulsen *vs.* Bettendorf Axle Company, 125 Northwestern Reporter 174.)

Trade Publications

Gasoline Storage Tanks.—The Air-Tight Steel Tank Company, Pittsburgh, Pa. Brochure. Relates to an air-tight steel gasoline storage tank. The advantages claimed for this tank are that the gasoline may be purchased in large quantities at a lower price, which also permits a stock to be on hand when wanted, decreased insurance rates due to the elimination of all danger from explosion and fire, the obviating of loss through evaporation and the ability to pipe the gasoline any reasonable distance. These tanks are built in sizes from one barrel up, of 3-16-in. boiler plate with brazed joints. These tanks are intended to be buried in the ground and have the supply of gasoline drawn off as desired. The pump is of the simple force type, which causes a steady stream of the fluid to flow into the filling can or directly into the motor supply tank. The flow can be instantly stopped by opening the air cock on the pump, which releases the air pressure and the gasoline remaining in the hose and outlet pipe is then automatically siphoned back into the storage tank. To prevent gasoline from flowing into the pump pipe from the reservoir a ball check valve is provided which uncovers the port leading to the pipe only when pressure is applied to the pump.

Gears and Pinions.—The Simonds Mfg. Company, Liberty avenue and Twenty-fifth street, Pittsburgh, Pa. Catalogue; size 6 x 9 in.; pages 106. Deals with gears and pinions for electric railroads, mines and industrial haulage and special gearing of all kinds. The different styles of gears include spur, worm, bevel and miter gears. The different gears used on mining machinery and mine motors are illustrated and considerable useful information on general subjects and on gearing in particular is appended.

Water Works Supplies.—The Kennedy Valve Mfg. Company, Elmira, N. Y. Catalogue; size 5¼ x 9¼ in.; 30 pages. Pertains to the line of valves and hydrants manufactured by this company. Illustrations and tabulated dimensions of several different types of gate valves, swinging check valves, compression fire hydrants, cast iron extension valve boxes and floor stands are included.

Valves.—National Brake & Electric Company, Milwaukee, Wis. Bulletin No. 389. Describes and illustrates the various types of National emergency and variable release valves for electric railroad service. These valves are designed to overcome the deficiencies of the straight air-brake system, which, while admirable for controlling single cars, is said to lack in the element of safety which is so essential to all electric traction service. The principal advantage of these valves is that should the train part the brakes are automatically set, a thing that is not possible with the ordinary straight air system. In this way all the safety features of automatic air-brake equipment are secured with the elimination of all the complications.

Roofing.—H. W. Johns-Manville Company, 100 William street, New York City. Pamphlet. Contains a number of illustrations of free selling helps which the company is prepared to furnish to dealers handling the J-M Regal roofing. These helps include advertisements for which electrotypes can be furnished, booklets and metal signs.

Sheet Metal Shop Specialties.—David Lupton's Sons Company, Allegheny avenue and Tulip street, Philadelphia, Pa. Catalogue No. 4; size 6 x 9 in.; pages 52. Calls attention to the Lupton specialties for shops and industrial buildings. These include steel sash for side walls, steel skylight and hollow metal windows. The sash is made of rolled steel sections with a special type of joint to lock the parts securely together. The units in which this sash is built are made in a number of sizes, all of which are interchangeable. The steel skylight is built up of 3-16-in. bars of a peculiar cross section covered by a cap of cold rolled copper or Monel metal. The metal fireproof windows of this company are constructed in accordance with the requirements of the National Board of Fire Underwriters. Other specialties illustrated and described include the Pond continuous sash and the Pond operating device for pivoted sash. *The Iron Age* June 11, 1908, contained an illustrated description of the Pond sash operating device.

Fuel Economizers and Mine Fans.—B. F. Sturtevant Company, Hyde Park, Mass. Three bulletins. Nos. 161 and 163 deal with the use of economizers in the power plants of textile and steel mills and machinery factories. While the heating of feed water is the primary use of the economizer in a textile mill, it furnishes an economical means of obtaining the vast quantities of hot water used for boiling, washing and dyeing. Both of these bulletins have a number of illustrations showing the plants where the economizers have been installed. No. 166 discusses the subject of mine ventilation and shows how a good supply of cold fresh air can be obtained in the underground workings by using Sturtevant mine fans.

Electrical Apparatus for Iron and Steel Industries.—Westinghouse Electric & Mfg. Company, Pittsburgh, Pa. Pamphlet; size 7 x 10 in.; pages 128. Treats of the development of electric motors for use in the iron and steel industries. All of the different types of alternating and direct current motors and the apparatus for controlling them are illustrated and described. Attention is directed to the fact that complete installations of power house equipment can be made by employing the products of this company. Space is given to the low pressure steam turbine and an enumeration of its advantages for increasing the plant capacity, and the subject of lighting the plants with inclosed carbon arc lamps, metallic flame arcs or incandescent lamps is also treated. All the different appliances are illustrated and in a number of cases views show the machines to which they are applied. *The Iron Age* March 18, 1909, printed an illustrated description of the type MS alternating current mill motor.

Steel Plate Construction for Blast Furnaces.—The William B. Pollock Company, Youngstown, Ohio. Supplement No. 18 to the company's general book of views of notable blast furnaces it has constructed, is devoted to the New No. 1 furnace of the Andrews & Hitchcock Company, Hubbard, Ohio, recently built. The illustrations show various views of the furnace.

Gas-Electric Motor Cars and Light Diffusers.—General Electric Company, Schenectady, N. Y. Two bulletins. No. 4729, superseding No. 4660, illustrates and describes the various designs of Mazda economy diffusers designed for use in connection with the Mazda high efficiency lamp for lighting large areas. The special advantages claimed for this diffuser are wide range of capacity, relatively low intrinsic brilliancy, with excellent diffusion and economical distribution of light. Two principal types of diffusers are made: a plain one for store and mill use and a more ornate model for installations where the surroundings demand an elaborate design. No. 4730 describes a single-truck model of a gas-electric motor car. The equipment consists of a direct-coupled gas engine and generator with an exciter on the same shaft, all completely inclosed and mounted between the axles of the truck and below the car floor, so that the interior of the car is entirely unobstructed. The car, motor and engine are illustrated and described, and the bulletin also contains a table of the speeds regularly obtained from this equipment.

Recording Thermometer.—The Bristol Company, Waterbury, Conn. Bulletin No. 124. Treats of an instrument for recording the temperature of the outside atmosphere on a recorder installed indoors. This instrument makes continuous records of the temperature day and night upon a chart revolved once a week or once every 24 hours. The advantage of this kind of thermometer is that the recorder need not be exposed to the injurious influences of inclement weather, but may be installed indoors 25 ft. or more away from the sensitive bulb placed outdoors. The two are connected by a flexible copper capillary tube. The illustrations include a thermometer, a suggested installation scheme and different types of record charts.

Gears.—Boston Gear Works, Norfolk Downs, Mass. Catalogue E 3. Covers bevel, spur and internal gears and racks, universal joints and spiral and helical gears. In addition to these there are shown various types of transmission chains, escape wheels, ratchets, pawls, brass clutches, thrust collar bearings, and a safety automobile stearing device.

Construction Work.—Westinghouse, Church, Kerr & Co., 10 Bridge street, New York City. Fourth edition of a booklet entitled "Work Done." Concerned with a few of the more recent examples of construction contracts carried out by this company. All of these projects are illustrated and described and altogether cover a very wide range of work, extending from a small pier and landing float for a country residence to large factories, shops, electric light and railroad power houses, and interurban railroad lines.

Fan Motors.—Fort Wayne Electric Works, Fort Wayne, Ind. Booklet No. 5022. Contains brief illustrated descriptions of the various types of fan motors manufactured by this company. The line of motors includes both alternating and direct current styles for desk and bracket fans, telephone booth fans, revolving fans, oscillating desk and wall fans, ceiling and column fans and ventilating fans.

Boring Mills.—Gisholt Machine Company, Madison, Wis. Catalogue. Relates to the Gisholt vertical and horizontal boring mills. The mills and their different parts are described in the introductory pages and the succeeding facing pages contain illustrations and brief descriptions of the various sizes of mills and the special equipment that can be furnished. These mills are made in several sizes ranging in swing from 30 to 84 in., inclusive. All mills above the 36-in. size can be equipped with motor drive if desired. The illustrations include the different sizes of machines, some of the operations performed on them and the turret lathe and tool grinder of this company.

Electric Fans, Electric Hoists and Armored Hose.—The Sprague Electric Company, 527 West Thirty-fourth street, New York. Catalogue and two flyers. Catalogue No. 321 is descriptive of the line of direct and alternating current electric fan motors manufactured by this company, which includes 12 and 16 in. universal joint combination adjustable desk and bracket fan motors, telephone booth motors provided with a spring suspension which prevents any vibration being transmitted to the walls of the booth, midget exhaust fan motors, ceiling and column fan motors with two and three speeds, and

ventilating fan motors. Flyer No. 233 treats of the various types of Sprague electric hoists equipped with either alternating or direct current motors. The illustrations show the hoists themselves and also various applications of them in foundries, boiler rooms and paper mills. Flyer No. 516 deals with flexible armored hose for steam and compressed air. The peculiar manner in which the armor construction is applied is described, and a number of views show the different classes of work for which this hose may be used.

Feed Water Heater.—The Re-Heater Company, New York City. Booklet. Gives general descriptions and specifications for a new type of feed water heater which is claimed to be a combination of the best features of both the open and closed forms. The heater consists of a drum similar in construction to the standard type of closed feed water heaters mounted on a base which is an open heater and purifier. The advantages claimed for the re-heater are economy in fuel consumption, better purification of the water, higher feed water temperature, the elimination of hot water pump troubles and simplicity of operation.

Iron and Steel Cements.—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Booklet. Size 4½ x 6⅝ in.; pages 96. The ninth edition of the Smooth-On instruction book, which has just been brought out for free distribution, illustrates and describes the various ways in which these cements can be used to repair all sorts of iron and steel work.

Melting Furnaces.—Rockwell Furnace Company, 26 Cortland street, New York City. Bulletin M. Illustrates the Rockwell tilting crucible furnace for melting brass, copper, cobalt, aluminum, gold, iron, manganese, silver, vanadium and other metals. These furnaces employ oil or gas as fuel and are so constructed with a combustion chamber in the rear that the flame projects downward against the bottom of the chamber and not against the crucible. Another great advantage of this type of furnace is that if the crucible should break during a heat the metal is all retained in the furnace and the heat may be continued as though the crucible had not broken, the metal being poured the same as in the open flame type. Four sizes of furnace are built having working capacities ranging from 200 to 1100 lb.

Electric Fan and Air Purifier.—American Blower Company, Detroit, Mich. Brochure No. 260, entitled "Ventilation for Comfort and Health." Points out the advantages of using the Sirocco electric fan and air purifier for securing good ventilation the entire year round. This ventilator can be used either to supply pure filtered air from the exterior or to exhaust foul and poisonous air from the interior of a room, and is instantly reversible. It is intended to be placed on the window sill and can be operated from an ordinary electric light socket. The illustrations show a number of installations of this device for ventilating offices, sleeping rooms, kitchens and other portions of the house.

Leather Belting.—Chas. A. Schieren Company, 37 Ferry street, New York City. Pamphlet. Gives a complete description of the company's exhibit at the International Exposition now being held at Brussels, Belgium. This exhibit is somewhat unique and shows eight different types of belt drive in operation. All of these drives are hard and peculiar and serve to illustrate the different qualities of the company's Duxbak waterproof leather belting. These exhibits bring out very clearly the waterproof quality of the belting and its adaptability for power transmission where the distance between the shafts is short and they may or may not be in the same plane.

Melting and Refining Furnaces.—W. S. Rockwell Company, 50 Church street, New York. Circular No. 10. Pertains to a line of reverberatory melting and refining furnaces employing either oil or gas as fuel. These are built in six sizes ranging from 1000 to 30,000 lb. nominal capacity. Although designed for either oil or gas fuel, the construction can be easily changed so as to be suitable for coal or coke.

Squeezers.—The Adams Company, Dubuque, Iowa. Circular No. 105. Describes and illustrates the Farwell line of squeezers, which are made in a number of different styles and sizes. *The Iron Age* May 5, 1910, printed an illustrated description of a squeezer designed for use with Keep hinged match plates, the 24-in. type of squeezer with an improved form of table and the 34-in. portable low down heavy duty model.

Bolt Cutters.—Landis Machine Company, Waynesboro, Pa. Catalogue. Size 6 x 9 in.; 48 pages. Illustrations and descriptive matter explain the operation of a line of single, double and triple head bolt cutters, single and double staybolt cutters, pipe and nipple threading machines, and bolt pointing machines. All of these machines are equipped with a special type of all-steel die head which was illustrated and described in *The Iron Age* October 1, 1908.

Horizontal Drilling and Boring Machines.—Pawling & Harnischfeger Company, Milwaukee, Wis. Folder. Deals with a line of horizontal drilling and boring machines which are made in several types for handling work of all classes where drills from ⅝ to 3 in. in diameter are used. The principal advantage claimed for these machines is that they cover an extremely large surface area with one setting of the work, and being of a flexible character can be used to great advantage upon intricate drilling work which could not be handled economically by other types of machines. One illustration shows an installation of three of these drills in a machine shop, and a partial list of users is appended.

Boring, Drilling and Milling Machines and Power Presses.—Lucas Machine Tool Company, Cleveland, Ohio. Two circulars. Circular E-2 is concerned with the No. 21 Precision horizontal boring, drilling and milling machine, in which the spindle head, which is a constant weight, is raised and lowered instead of changing the position of the table with its load, that is very variable. The advantage of this is that a very stiff and deep box base can be used which provides a solid foundation for the other members of the machine, keeps them in accurate relation to each other in all positions and eliminates the necessity of using a foundation under the machine. This machine may be driven in any one of four different ways—namely, cone pulley, constant speed belt drive with gear box for speed changes in either a parallel or right angle drive, or a direct connected electric motor. Circular C-7 refers to the Lucas power forcing press, which is designed for the range of work between the hand or screw press and the hydraulic press. It is controlled by a single hand wheel, and it is said to be exceedingly simple and effective and can be employed for performing a large variety of operations requiring pressure.

Electric Generators and Exhaust Fans.—Crocker-Wheeler Company, Ampere, N. J. Three bulletins. No. 119, superseding No. 107, describes a line of direct current lighting and power generators in sizes ranging from 200 to 1200 kw. No. 121 treats of the small engine type direct current generators for supplying electric light and power from isolated plants. This type will be found economical where boilers are used for heating, as in many cases they are sufficient to drive an electric plant without appreciably increasing the coal consumption during the winter. No. 124, superseding No. 112, treats of the standard C-W exhaust fans, which are made in sizes ranging from 18 to 42 in. in diameter.

Power Pumps.—The Lucas Pump Company, Dayton, Ohio. Folder. Describes and illustrates two styles of power pumps for use with pneumatic pressure outfits to furnish water supply for factories, public buildings, isolated buildings, dwellings and farm use. These pumps can be furnished for belt connection to some form of prime mover, but are generally driven by a direct connected electric motor of either alternating or direct current type, as this enables a self-starting and pressure regulating device to be used to maintain the pressure between required limits automatically.

Drill Grinders.—The Washburn Shops of the Worcester Polytechnic Institute, Worcester, Mass. Catalogue E. Devoted to the Worcester drill grinders, which are built in these shops for both dry and wet grinding. There are brief descriptions of the various special features, followed by illustrations and specifications of the tools themselves. Five styles of grinder are built. Five sizes of the dry grinder are made in the five styles except the smallest, which is designed for grinding drills from No. 56 to ⅛ in. This is made in a bench model and a small column model driven by an independent countershaft located overhead. The largest dry grinder, intended for drills from ⅝ to 4 in. in diameter, is made in all but these two styles. Two sizes of wet grinder made, having a capacity of from ¼ to 2¼ in. and ⅝ to 4 in., respectively. The former is made in all five styles, while the latter is constructed in three styles for driving from an attached countershaft, an air motor or an electric motor.

Tachometers and Recording Gauges.—The Industrial Instrument Company, Foxboro, Mass. Vol. 2, No. 2, of the *Foxboro Recorder*. Calls attention to the Horn hand tachometer and the Hutchinson electrical tachometer for industrial and marine work. A tachograph for obtaining a graphic record of the variation in the speed of machinery and engines and a recording pressure gauge are also described. An illustrated description of the Hutchinson electrical marine tachometer was printed in *The Iron Age* January 27, 1910.

Locomotive Fireboxes.—The William H. Wood Locomotive Fire Box & Tube Plate Company, Media, Pa. Booklet. Illustrates and describes a type of firebox for locomotives in which, it is stated, an increased heating surface is secured, the strength of the box increased, the expansion and contraction of the box divided equally between each staybolt, and less sediment deposited on the surface of the box by the water.

Steel Lettering Dies.—James H. Matthews & Co., 306 Wood street, Pittsburgh, Pa. Booklet. Size, 5 x 6 in.; 24 pages. Refers to a line of steel dies for marking raised letters on tin and aluminum products, hand stamps for marking hot or cold metals, pipe mill dies for insertion in pipe rolls, inspectors' steel hammers, steel wheels for marking designs on wood or other products, billet markers and sets of hand-made steel letters and figures. The steel for these dies is heated to the proper temperature, as indicated by a pyrometer, to secure hardness and lasting service, and after the die has left the furnace it is tested by the Scleroscope to see if the proper degree of hardness has been attained.

CURRENT METAL PRICES.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought are given elsewhere in our weekly market report.

IRON AND STEEL—

Bar Iron from store—

Refined Iron:

1 to 1¾ in. round and square; 1½ to 4 in. x ⅜ to 1 in.; 1½ to 6 in. x ¼ to 5-16.....₩ lb 1.90¢

Rods—⅜ and 11-16 round and square.....₩ lb 2.10¢

Angles:	Cts ₩ lb
3 in. x ¼ in. and larger	2.10¢
3 in. x 3 16 in. and ⅛ in.	2.35¢
1½ to 2½ in. x ¼ in.	2.20¢
1½ to 2¾ in. x 3-16 in. and thicker	2.10¢
1 to 1¼ in. x 3-16 in.	2.20¢
1 to 1¼ x ⅛ in.	2.30¢
⅞ x ⅛ in.	2.40¢
¾ x ⅛ in.	2.50¢
⅝ x ⅛ in.	3.55¢
½ x 3-32 in.	4.35¢
Tees:	
1 in.	2.65¢
1¼ in.	2.45¢
1½ to 2½ x ¼ in.	2.15¢
1½ to 2½ x 3-16 in	2.35¢
3 in. and larger	2.15¢
Beams	2.10¢
Channels, 3 in. and larger	2.10¢
Bands—1 to 6 x 3-16 to No. 8	2.35¢
"Burden's Best" Iron, base price	3.15¢
Burden's "H. B. & S." Iron, base price	2.95¢
Norway Bars	3.60¢

Merchant Steel from Store—

per lb

Bessemer Machinery	1.90¢
Toe Calk, Tire and Sleigh Shoe	2.50@3.00¢
Best Cast Steel, base price in small lots	7¢

Sheets from Store—

Black

	One Pass, C.R Soft Steel.	R. G. Cleaned.
No. 16	₩ lb 2.90¢	3.00¢
Nos. 18 to 21	₩ lb 2.95¢	3.10¢
Nos. 22 and 24	₩ lb 3.05¢	3.20¢
No. 26	₩ lb 3.10¢	3.30¢
No. 28	₩ lb 3.20¢	3.50¢

Russia, Planished, &c.

Genuine Russia, according to assortment.....₩ lb 12 @14½

Patent Planished, W. Dewees Wood, ₩ lb A, 10¢; B, 9¢ net

Galvanized.

Nos. 14 to 16	₩ lb, 3.20¢
Nos. 22 to 24	₩ lb, 3.55¢
No. 26	₩ lb, 3.75¢
No. 28	₩ lb, 4.10¢

No. 20 and lighter 36 inches wide, 25¢ higher.

Genuine Iron Sheets—

Galvanized.

Nos. 22 and 24	₩ lb ..5.75¢
No. 26	₩ lb ..6.25¢
No. 28	₩ lb ..7.25¢

Corrugated Roofing—

2½ in. corrugated.	Painted	Galvd.
No. 24 ₩ 100 sq. ft.	$3.85	4.80
No. 26 ₩ 100 sq. ft.	2.95	4.00
No. 28 ₩ 100 sq. ft.	2.60	3.75

Tin Plates—

American Charcoal Plates (per box.)

"A.A.A." Charcoal:	
IC, 14 x 20	$6.35
IX, 14 x 20	7.60
A. Charcoal:	
IC, 14 x 20	$5.40
IX, 14 x 20	6.50

American Coke Plates—Bessemer—

IC, 14 x 20.....107 lb	$4.40
IX, 14 x 20	5.40

American Terne Plates—

IC, 20 x 28 with an 8 lb. coating	$8.50
IX, 20 x 28 with an 8 lb. coating	10.50

Seamless Brass Tubes—

List November 13, 1908. Base price 18¢

Brass Tubes, Iron Pipe Sizes—

List November 13, 1908. Base price 18¢

Copper Tubes—

List November 13, 1908. Base price 22¢

Brazed Brass Tubes—

List August 1, 1908. 19½¢ ₩ lb

High Brass Rods—

List August 1, 1908. 14½¢ ₩ lb

Roll and Sheet Brass—

List August 1, 1908. 14½¢ ₩ lb

Brass Wire—

List August 1, 1908. 14½¢ ₩ lb

Copper Wire—

Base Price. Carlond lots mill 14½¢

Copper Sheets—

Sheet Copper Hot Rolled, 16 oz (quantity lots) ₩ lb 18¢

Sheet Copper Cold Rolled, 1¢ ₩ lb advance over Hot Rolled.

Sheet Copper Polished 20 in. wide and under, 1¢ ₩ square foot.

Sheet Copper Polished over 20 in. wide, 2¢ ₩ square foot.

Planished Copper, 1¢ ₩ square foot more than Polished.

METALS—

Tin—

Straits Pig.....₩ lb 34½@35¢

Copper—

Lake Ingot	₩ lb 14⅜@15 ¢
Electrolytic	₩ lb 14½@15 ¢
Casting	₩ lb 14¼@14½¢

Spelter—

Western.....₩ lb 6½@6¾¢

Zinc.

No 9, base, casks.....₩ lb 8 ¢ | Open.....₩ lb 8½¢

Lead.

American Pig	₩ lb 5 @5¼¢
Bar	₩ lb 6¾@6¼¢

Solder.

½ & ½, guaranteed	₩ lb 22½@22¾¢
No. 1	₩ lb 18¾@19¼¢
Refined	₩ lb 17¼@17¾¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Cookson	₩ lb ..@10¢
Hallett's	@10¢
Other Brands	@9½¢

Bismuth—

Per. lb $2.00@$2.25

Aluminum—

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting.....24¢

Rods & Wire.....Base Price 31¢

Sheets.....Base Price 33¢

Old Metals.

Dealers' Purchasing Prices Paid in New York

	Cents
Copper, Heavy cut and crucible	₩ lb 10.75@11.00
Copper, Heavy and Wire	₩ lb 10.50@10.75
Copper, Light and Bottoms	₩ lb 9.50@ 9.75
Brass, Heavy	₩ lb 7.00@ 7.50
Brass, Light	₩ lb 5.70@ 6.00
Heavy Machine Composition	₩ lb 9.75@10.00
Clean Brass Turnings	₩ lb 7.00@ 7.25
Composition Turnings	₩ lb 8.00@ 8.25
Lead, Heavy	₩ lb ....@ 3.60
Lead, Tea	₩ lb ....@ 3.25
Zinc Scrap	₩ lb ....@ 3.75

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